



## APPENDIX III

### RESEARCH AND DEVELOPMENT ACTIVITIES

Appendix III contains a complete listing of all the Next Generation Air Transportation System (NextGen) Research and Development (R&D) Activities in numerical order according to their unique identification number. R&D Activities are ongoing programs that have required outputs based on the planning elements they support. Research Activities depict basic or applied research programs and Development Activities describe the results needed from ongoing development or demonstration programs.

Each listing displays a timetable and the following information for each Research and Development Activity:

- **Research/Development Description:** The description defines the focus of the area being researched and/or developed including the context and desired results.
- **Suggested Office of Primary Responsibility (SOPR):** The suggested Partner that will have primary responsibility to conduct the reference Research or Development Activity.
- **Suggested Office of Collateral Responsibility (SOCR):** The suggested Partner (s) that will collaborate with the SOPR to conduct the particular Research or Development Activity.
- **Agency Programs:** The existing or planned programs within one or more agencies that align to the reference Research or Development Activity.
- **Prerequisite Elements:** The timetable lists the identification number and title of any prerequisite planning elements.
- **Successor Elements:** The timetable lists the identification number and title of all elements supported by the referenced Research or Development Activity.
- **Required Prerequisite Date:** Research and Development activities are ongoing activities and do not have prescribed dates. Their required output dates are determined by their supported elements. By convention within the Integrated Work Plan, Research and Development activities are due two years prior to the target date of the supported element.
- **Required Completion Date:** The required date for a Research or Development activity is set, by convention, to be two years prior to the target date of the supported element. This target date is the initial availability date for Enablers.

---

*Complete information on IWP planning elements is available in the interactive Joint Planning Environment (JPE). The JPE is available at [www.jpdo.gov](http://www.jpdo.gov).*

## Research Activities Listing

### R-0020 Applied Research on Vulnerability Discovery

**Description:** Applied research on vulnerability discovery to support analysis tool development for safety assurance and Safety Risk Management (SRM) using Aviation Safety Information Analysis and Sharing (ASIAS) capabilities.

**SOPR:** NASA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0020: Applied Research on Vulnerability Discovery																		
EN-3023: Automated System Vulnerability Detection				R	E	2011												
EN-3103: Safety Assurance Processes and Tools								2016	R	E	2018							
D-2145: Vulnerability Detection Tools				R	D	2009												

### R-0040 Applied Research on Critical NextGen Aircraft Capabilities

**Description:** Applied research on critical NextGen aircraft capabilities that will support the development of standards and certification procedures.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen - System Development - 1A13

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0040: Applied Research on Critical NextGen Aircraft Capabilities																		
D-0330: Aircraft-Based Precision Approach Capability				R	D	2011												

### R-0050 Applied Research on Sustainable Environmental Ramp Operations

**Description:** Applied research on efficient ramp operations during winter weather conditions, including sustainable environmental practices.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0050: Applied Research on Sustainable Environmental Ramp Operations																		
EN-0046: Environmentally Improved Surface Operations - Level 2 - Enhanced					2013	R	E	2015										
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts				2011	R	D	2013											

### R-0060 Applied Research on Intermodal Travel Behavior in High-Density Corridors

**Description:** Applied research on Intermodal travel behavior and the impact of travel demand in high-density corridors linking mega-regions on the east and west coasts.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0060: Applied Research on Intermodal Travel Behavior in High-Density Corridors																		
EN-5041: Regional Planning Processes			2010	R	E	2012												
EN-5053: Airport Intermodal Ground Access Mobility Systems					2012	R	E	2014										

### R-0070 Applied Research on Optimizing Landside Design to Promote Passenger Movement

**Description:** Applied research on optimizing landside terminal design to facilitate passenger movement between gates and ground access or intermodal transportation connections.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0070: Applied Research on Optimizing Landside Design to Promote Passenger Movement																		
EN-5026: Design Guidelines for NextGen Airport Passenger Terminal Buildings					2013	R	E	2015										

### R-0080 Applied Research of Best Management Practices for Regional System Planning

**Description:** Applied research to identify best management practices in planning processes that will align airport and ground transportation needs through coordinated regional transportation system planning.

**SOPR:** FAA

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0080: Applied Research of Best Management Practices for Regional System Planning																		
EN-5041: Regional Planning Processes					2010	R	E	2012										

### R-0090 Applied Research on Industry Standards for Intermodal Travel Planning

**Description:** Applied research on industry information standards for intermodal travel planning.

**SOPR:** Industry

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0090: Applied Research on Industry Standards for Intermodal Travel Planning																		
EN-5029: Intermodal Ground Transportation Information System					2011	R	E	2013										
D-2119: Passenger Information System for Intermodal Travel Planning					R	D	2011											

### R-0100 Applied Research on Accuracy and Resolution Requirements for NextGen Weather Forecasts

**Description:** Applied research on identifying the required spatial and temporal resolution and accuracy for weather forecast information.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – Reduce Weather Impact – 1A15A

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0100: Applied Research on Accuracy and Resolution Requirements for NextGen Weather																		
D-0840: Weather Forecast Assessment Verification System					R	D	2011											
D-1530: Spatial Weather Prediction Models for the 4D Weather Cube					R	D	2011											

### R-0110 Applied Research on the Integration of Forecast and Observational Data

**Description:** Applied research on the integration of forecast and observational data into a real-time single authoritative source of current weather information, which supports the initial development of the four dimensional (4D) weather information system.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen Network Enabled Weather  
DOC – Data Management Standards  
Development

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0110: Applied Research on the Integration of Forecast and Observational Data																		
D-2117: Network-Enabled Weather Data Standards					D	2008												
D-0840: Weather Forecast Assessment Verification System					R	D	2011											

## Research Activities Listing

### R-0120 Applied Research on Low-Visibility and Surface Operation Technologies

**Description:** Applied research on increased operator situational awareness for low-visibility terminal and airport surface operations to support an alternative selection for increasing surface movement efficiency.

**SOPR:** NASA

**SOOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project FAA—FAA – NextGen – System  
Development – 1A13 FAA – NextGen R,E&D

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0120: Applied Research on Low-Visibility and Surface Operation Technologies																		
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations	R	D	2009															

### R-0130 Applied Research on Automation-Assisted Collaboration Capabilities

**Description:** Applied research on automation-assisted collaboration capabilities including the stakeholder's level of participation in the collaboration process.

**SOPR:** FAA

**SOOCR:**

**Agency Programs:** FAA – NextGen – Collaborative ATM –  
1A17A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0130: Applied Research on Automation-Assisted Collaboration Capabilities																		
D-0150: Collaborative Negotiation Capabilities for Expanded Oceanic Track Entry Points	R	D	2009															
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations	R	D	2009															

### R-0140 Applied Research on 4DT Use in Clearances and Flight Plans

**Description:** Applied research on Four-Dimensional Trajectory (4DT) use in clearances and flight plans for further development and incorporation into future flight planning systems, Air Traffic Management (ATM) automation, and aircraft flight management systems (FMS).

**SOPR:** FAA

**SOOCR:**

**Agency Programs:** FAA - NextGen - Trajectory-Based Operations  
- 1A14A FAA - NextGen - Collaborative ATM  
- 1A17A NASA/ARMD/ASP/NGATS ATM  
Airspace Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0140: Applied Research on 4DT Use in Clearances and Flight Plans																		
D-2129: Required Aircraft 4DT Intent Data					2013	R	D	2015										

### R-0180 Applied Research on Secure Information Exchanges at Command and Control Facilities

**Description:** Applied research on secure connectivity and information sharing for international passenger processing operations, Regional and National Intelligence, and Threat Warning entities within a secure airport command and control facility environment.

**SOPR:** DHS

**SOOCR:**

**Agency Programs:** DHS – TSA Security Technology Integration  
Program DHS – US VISIT DHS – S&T  
Information Sharing IPT Research Program  
DHS – Interoperability IPT Research Program

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0180: Applied Research on Secure Information Exchanges at Command and Control Facilities																		
D-0460: Enterprise Airport Security Data Management System																		

## Research Activities Listing

### R-0200 Applied Research on Noise and Emissions Relationship Science and Models

**Description:** Applied research identifying the relationship between noise and various emissions to inform the implementation of next generation environmental analysis tools to support environmental management systems (EMS) and policy decisions.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environment and Energy – advanced noise and emissions reduction, 1A09C FAA – Environment and Energy - A13a FAA – NextGen Environment and Energy – validation model, 1A09D FAA – NextGen Environmental Research—Aircraft Technologies, Fuels, and Metrics, A13b NASA/ARMD/Fundamental Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0200: Applied Research on Noise and Emissions Relationship Science and Models																		
EN-6048: Environmental Impact Modeling and Assessment - Level 2									2016	R		E	2018					
D-1020: NextGen (N+1) EMS Analysis Tools							2014	R		D	2016							

### R-0230 Applied Research on Facility-Independent Techniques for Networked Facility Operations

**Description:** Applied research on facility-independent techniques and practices supporting networked facility operations.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – Network Facilities – 1A120A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0230: Applied Research on Facility-Independent Techniques for Networked Facility Operations																		
D-0240: Facility and Networking Alternatives																		

### R-0270 Applied Research on a National Surveillance and Communications Needs Assessment

**Description:** Applied research for assessing the needs for a national surveillance and communications capability.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0270: Applied Research on a National Surveillance and Communications Needs Assessment																		
EN-1006: Integrated Cooperative Surveillance Information - Level 1																		
EN-1504: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 3																		
D-2143: National Surveillance Architecture																		

### R-0310 Basic Research on Airport System Evolution in Large Metropolitan Areas

**Description:** Basic research on the evolution of airport systems in large metropolitan areas. This research will provide an understanding of how systems develop in response to economic and population growth, changes in airport and airline industry structure, ground access times and costs, and available airport capacity.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0310: Basic Research on Airport System Evolution in Large Metropolitan Areas																		
EN-5041: Regional Planning Processes																		
EN-5032: Streamlined Airport Development Processes																		

## Research Activities Listing

### R-0340 Applied Research on 3D RNAV/RNP Procedures

**Description:** Applied research on Three Dimensional (3D) Area Navigation/Required Navigation Performance (RNAV/RNP) procedures for aircraft operator implementation.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen - Flexible Terminals and Airports - 1A18A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0340: Applied Research on 3D RNAV/RNP Procedures																		
D-0870: Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations			R	D	2009													
D-2127: 3D RNAV/RNP Procedures			R	D	2010													

### R-0350 Applied Research on Air and Ground-Based Runway Incursion Detection Technologies

**Description:** Applied research on complementary air- and ground-based runway incursion prevention and detection systems.

**SOPR:** NASA

**Agency Programs:** FAA - NextGen - Flexible Terminals and Airports - 1A18A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0350: Applied Research on Air and Ground-Based Runway Incursion Detection Technologies																		
D-2133: Air and Ground-based Runway Incursion Detection Technology			R	D	2011													

### R-0370 Applied Research on Traffic Spacing Management in Terminal and Transition Airspace

**Description:** Applied research on traffic spacing management for transition, arrival, and departure operations supporting high-throughput delivery of aircraft to the runway threshold and high-throughput departure operations.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project NASA/ARMD/ASP/NGATS ATM  
Airportal Project FAA - Wake Turbulence, A12.b

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0370: Applied Research on Traffic Spacing Management in Terminal and Transition Airspace																		
D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace			R	D	2010													

### R-0410 Applied Research on the Integration of Arrival/Departure and Surface Operations

**Description:** Applied research on integrating arrival/departure flow management with surface operations.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project FAA - NextGen - High Density  
Arrival/Departures - 1A16A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0410: Applied Research on the Integration of Arrival/Departure and Surface Operations																		
EN-0009: Integrated Trajectory/Separation Management - Terminal													2020	R	E	2022		

### R-0470 Applied Research on Radio Spectrum Needs and Alternatives

**Description:** Applied research related to radio spectrum required to support NextGen data communications including: an assessment of the limits of current data links (VDL Mode 2, High Frequency (HF), SATCOM); and an estimate of the bandwidth, latency, and availability requirements for anticipated NextGen data streams including CPDLC, trajectories, airspace information, and weather. Weigh the potential influence of space weather and other sources of interference in any new data link concepts. If current data links are projected to be insufficient, research appropriate new spectrum assignments and/or allocations. Follow-on development and enabler activities should be planned at that time. Harmonization with Euro control and other international peers should be carefully considered. This activity is essential to support agency decisions on whether new spectrum requirements or management techniques should be pursued.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0470: Applied Research on Radio Spectrum Needs and Alternatives																		
EN-1010: Future Radio Spectrum	2010	R		E	2012													

### R-0500 Applied Research on Variable Separation Standards

**Description:** Complete applied research on options for procedures, standard specifications, decision-support aids, and displays to support an alternative selection to enable variable separation standards based on performance levels in all airspace.

**SOPR:** NASA

**Agency Programs:**

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0500: Applied Research on Variable Separation Standards																		
EN-0031: Avionics - Airborne Merging and Spacing				2011	R		E	2013										

### R-0510 Applied Research on Air and Ground Separation Management Architectures

**Description:** Applied research on air and ground separation management architectures that can satisfy NextGen's increased capacity and safety requirements.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS – ATM Airspace  
Project NASA/ARMD/ASP/NGATS – ATM  
Airportal Project NASA/ARMD/ASP, AvSafe,  
Fundamental Aeronautics

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0510: Applied Research on Air and Ground Separation Management Architectures																		
D-0260: Development of NextGen Interagency NCI Requirements				R	D	2009												
D-2135: Air and Ground Separation Management Architecture				R			D	2011										

### R-0530 Applied Research on Automated Air and Ground Separation Management Alternatives

**Description:** Applied research on ground and airborne automated separation management options, which will guide the selection of technology and procedures development for Trajectory-Based Operations (TBOs).

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS - ATM Airspace  
Project NASA/ARMD/ASP, AvSafe,  
Fundamental Aeronautics

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0530: Applied Research on Automated Air and Ground Separation Management Alternatives																		
D-2135: Air and Ground Separation Management Architecture				R			D	2011										

### R-0540 Applied Research on Flexible Airspace Design Configurations

**Description:** Applied research on flexible airspace design configurations, including corridors, to support an alternative selection of performance-based adaptable airspace structures.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project FAA – NextGen – System  
Development – 1A13

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0540: Applied Research on Flexible Airspace Design Configurations																		
D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures				R			D	2011										

### R-0580 Applied Research for Initial Probabilistic Weather Forecasts

**Description:** Applied research for the first generation of probabilistic weather forecasts (e.g., convective and winter storms, icing, turbulence, ceiling, and visibility).

**SOPR:** FAA

**Agency Programs:** NASA/SMD

**SOOCR:**



## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-0580: Applied Research for Initial Probabilistic Weather Forecasts</b>																		
<b>D-0840: Weather Forecast Assessment Verification System</b>			R	D	2011													
<b>D-2115: Initial Probabilistic Weather Forecasts</b>			R	D	2011													

### R-0590 Applied Research on Optimizing Visual Flight Rule (VFR) Operations

**Description:** Applied research on operational concepts for reducing the Visual Flight Rule (VFR) requirements for visibility and cloud clearance to increase the utility of VFR operations.

**SOPR:** FAA

**Agency Programs:** FAA – ADS-B

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-0590: Applied Research on Optimizing Visual Flight Rule (VFR) Operations</b>																		
<b>D-0480: Reduced Oceanic Separation Standards and Procedures</b>			R	D	2010													
<b>D-0490: 5nm Non-Radar Separation Standards and Procedures</b>			R	D	2010													
<b>D-2127: 3D RNAV/RNP Procedures</b>			R	D	2010													

### R-0600 Applied Research on Assessing and Predicting Wake Severity

**Description:** Applied research to assess and predict the severity of aircraft wake encounters based on aircraft parameters and wake encounter geometry.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen Wake Program  
FAA - NextGen - System Development - 1A13  
NASA/ARMD/ASP/NGATS ATM Airportal Project

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-0600: Applied Research on Assessing and Predicting Wake Severity</b>																		
<b>EN-0212: Parameter Driven Aircraft Separation Standards and Procedures</b>				2011	R	E	2013											
<b>D-0890: Dynamic Wake Management for Single Runway Operations</b>			R	D	2011													
<b>D-1680: Advanced Wake Sensing Capabilities</b>			R	D	2011													

### R-0610 Applied Research on Safe Taxi Operations in Low Visibility Conditions

**Description:** Applied research in safe taxi operations in low visibility conditions supporting options for the appropriate operator and air traffic management (ATM) roles.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal Project  
NASA/ARMD/ASP/Aviation Safety Program/Integrated Intelligent Flight Deck

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions</b>																		
<b>EN-0023: Surface Movement - Detail Operational Concept</b>			R	E	2011													
<b>D-1200: Guidance for Trajectory-Based Procedures</b>			D	2008														
<b>D-0880: Terminal and Surface Low Visibility ConOps</b>			R	D	2009													
<b>D-0360: Requirements for Taxi Instructions Submission</b>			R	D	2010													
<b>D-1250: Safe Taxi Operations in Low Visibility Conditions</b>			R	D	2010													

### R-0630 Applied Research on Effective Surface Management in Various Weather Conditions

**Description:** Applied research on effective ground operation management supporting interoperable surface and ramp traffic management capabilities for all-weather operations.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**



## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0630: Applied Research on Effective Surface Management in Various Weather Conditions																		
D-0880: Terminal and Surface Low Visibility ConOps																		

### R-0640 Applied Research on Metroplex Throughput Optimization

**Description:** Applied research on optimizing performance-based trajectories in transition airspace through the metroplex environment.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project FAA – NextGen – High Density  
Arrival/Departures – 1A16A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0640: Applied Research on Metroplex Throughput Optimization																		
EN-0027: Metroplex Flow Management Decision Support																		

### R-0660 Applied Research on Integrating NextGen Information into an Automated Environment

**Description:** Applied research on integrating weather, environmental, aeronautical, security, and emergency information into an automated environment. The research will also review options on how to make the information readily available and tailored to meet specific user needs.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project DOC - Weather Integration into ATM  
Decision Support Systems DOC - Model  
Impacts on NAS Performance

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0660: Applied Research on Integrating NextGen Information into an Automated Environment																		
D-0260: Development of NextGen Interagency NCI Requirements																		

### R-0670 Applied Research on Applying "Control by Points" TMI

**Description:** Applied research on the applicability of "control by points" Traffic Management Initiatives (TMI) to support the development options for flight operators to manage flights within the context of time-based control points.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project FAA - NextGen - Collaborative ATM -  
1A17A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0670: Applied Research on Applying "Control by Points" TMI																		
D-2127: 3D RNAV/RNP Procedures																		

### R-0680 Applied Research on the Methodologies for Dynamically Allocating NAS Resources

**Description:** Applied research on methodologies for the dynamic allocation of Air Navigation Service Providers (ANSP) and National Airspace System (NAS) resources including use of airspace for military and other national missions. This research will support changes to operational methodologies and support systems as well as policy decision such as PI-0007 'Rules of the Road' for how services and access, including prioritization of airspace use, will be equitably and dynamically distributed in a performance-based operation.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project DOC - Weather Integration into ATM  
Decision Support Systems DOC - Model  
Impacts on NAS Performance

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0680: Applied Research on the Methodologies for Dynamically Allocating NAS Resources																		
EN-0300: Networked Air Navigation Support Facilities																		
EN-0018: Trajectory Negotiation - Level 4 Automated 4DTs																		

## Research Activities Listing

### R-0690 Applied Research on an ATS Safety Baseline

**Description:** Applied research on an Air Transportation System (ATS) safety baseline measure for evaluating proposed operational changes and their safety impacts using the Safety Management System (SMS) process.

**SOPR:** FAA

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0690: Applied Research on an ATS Safety Baseline																		
EN-3102: Safety Risk Management Processes and Tools								2016	R	E	2018							

### R-0700 Applied Research on Efficient Screening Checkpoint Design Models

**Description:** Applied research on checkpoint design models to facilitate passenger throughput and minimize airport configuration changes.

**SOPR:** DHS

**Agency Programs:** DHS – Future of Checkpoint

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0700: Applied Research on Efficient Screening Checkpoint Design Models																		
EN-4110: Checkpoint Screening Technology - Optimize Screening Infrastructure Requirements						2013	R	E	2015									

### R-0740 Applied Research on "Drop-in" Alternative Aviation Fuels

**Description:** Applied research on "drop-in" alternative aviation fuels (i.e., fuels that can be used in place of current fuels), which will support candidate selection for further development addressing both environmental and economic considerations. This research will evaluate the alternative's performance, certification, safety requirements, environmental impacts, as well as, its large scale production potential.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen Environmental Research—  
Aircraft Technologies, Fuels, and Metrics,  
A13b FAA – NextGen Environment & Energy  
– Advanced Noise and Emissions Reduction,  
1A09C NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing  
DOE-working on some of the economic  
issues-per NSTC R&D Plan

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0740: Applied Research on "Drop-in" Alternative Aviation Fuels																		
D-0750: "Drop-In" Alternative Aviation Fuels																		

### R-0760 Applied Research on Water Pollution Impacts and Mitigation Options

**Description:** Applied research on water pollution mitigation options to understand impacts and support implementation decisions and monitoring by airport operators.

**SOPR:** FAA

**Agency Programs:** FAA – Airports Cooperative Research Program

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0760: Applied Research on Water Pollution Impacts and Mitigation Options																		
EN-6054: Enhanced Water Pollution Mitigation								2014	R	E	2016							

### R-0770 Applied Research on Dynamically Allocating National Airspace System (NAS) Demand

**Description:** Complete applied research on dynamically allocating demand to facilities to support an alternative selection to increase productivity, maintain capacity, and manage workload.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project FAA – NextGen – Network Facilities –  
1A120A

**SO CR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0770: Applied Research on Dynamically Allocating National Airspace System (NAS) Demand																		
EN-0300: Networked Air Navigation Support Facilities					2013	R		E	2015									

### R-0780 Applied Research of Air Navigation Service Providers (ANSP) Roles and Responsibilities

**Description:** Applied research on strategic job analysis of new roles and responsibilities of air traffic service providers to support decisions on personnel selection, training, and flexible resource management.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – System Development – 1A13

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0780: Applied Research of Air Navigation Service Providers (ANSP) Roles and Responsibilities																		
EN-0300: Networked Air Navigation Support Facilities					2013	R		E	2015									

### R-0790 Applied Research for a National Surveillance Architecture

**Description:** Applied research for a national surveillance architecture to meet the operational needs for NextGen, which includes air traffic management (ATM), defense, and security.

**SOPR:** DOD

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0790: Applied Research for a National Surveillance Architecture																		
EN-1503: Cooperative Surveillance - ADS-B IN/TIS-B/FIS-B Level 2					2012	R		E	2014									
EN-1506: Integrated Cooperative Surveillance Information - Level 2					2013	R		E	2015									
D-2143: National Surveillance Architecture	R		D	2010														

### R-0800 Applied Research on Certification Methods, Requirements, and Equipment Standards

**Description:** Applied research on certification methods, aircraft capability requirements, and equipment standards to support safety certification and operational approvals.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards																		
D-2100: Complex System Validation and Verification Tools and Techniques	R		D	2010														
D-2155: Availability and Accessibility of Required Information Design Guidelines		2011	R		D	2013												
D-2157: Usefulness and Understandability of Information Design Guidelines		2011	R		D	2013												
D-2159: Appropriate Human Engagement Design Guidelines		2011	R		D	2013												
D-2161: Operational Decision Aids Design Guidelines		2011	R		D	2013												
D-2163: Reliability and Airworthiness of Aircraft Design Guidelines		2011	R		D	2013												
D-2165: Vehicle Systems Health Management Design Guidelines		2011	R		D	2013												
D-2167: Reliability and Accuracy of Data and Information Design Guidelines		2011	R		D	2013												
D-2169: Aircraft Conformance to Operations Requirements Design Guidelines		2011	R		D	2013												
D-2173: Ground-Based Systems Health Management Design Guidelines		2011	R		D	2013												
D-2175: Ground-Based System Conformance Design Guidelines		2011	R		D	2013												
D-2177: Ground-Based System Contribution to Survival in Crash Scenarios Design Guidelines		2011	R		D	2013												

## Research Activities Listing

### R-0810 Applied Research on Noise, Emissions, and Performance Trade-offs for N+1 Aircraft

**Description:** Applied research to understand the realizable benefits and tradeoffs in the noise, emissions, and performance (fuel burn and take-off and landing field length) "corners of the design space" for the next generation (N+1) conventional subsonic aircraft.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0810: Applied Research on Noise, Emissions, and Performance Trade-offs for N+1 Aircraft																		
EN-6034: Environmental Tradeoffs and Metrics of Fuel Burn - Level 2 Enhanced																		
EN-6007: Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)																		
D-1010: NextGen Vehicle Technologies																		

### R-0820 Applied Research for Required Aircraft 4DT Intent Data

**Description:** Applied research to define Four-Dimensional Trajectory (4DT) intent data output and associated precision requirements to support fixed and variable separation management and procedures in performance-based airspace.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS - ATM Airspace  
Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0820: Applied Research for Required Aircraft 4DT Intent Data																		
D-2129: Required Aircraft 4DT Intent Data																		

### R-0860 Applied Research on Hazard Information Exchange using Aircraft Sensor Technology

**Description:** Continuous applied research on the use of aircraft sensors to share critical hazard information directly with nearby aircraft to enhance safety.

**SOPR:** FAA

**SO CR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0860: Applied Research on Hazard Information Exchange using Aircraft Sensor Technology																		
EN-2070: Aircraft Systems - Aircraft-Aircraft Hazardous Weather Information Sharing																		
D-2117: Network-Enabled Weather Data Standards																		
D-2191: Enhanced Airborne-Based Weather Sensors																		

### R-0910 Applied Research on Optimizing Overlapping Runway Occupancies

**Description:** Applied research to support alternative selection and policy decisions for overlapping aircraft runway occupancy during simultaneous runway operations.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS - ATM Airportal  
Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0910: Applied Research on Optimizing Overlapping Runway Occupancies																		
D-1200: Guidance for Trajectory-Based Procedures																		
D-0330: Aircraft-Based Precision Approach Capability																		

## Research Activities Listing

### R-0930 Applied Research on Low Visibility Independent Parallel and Converging Approach Procedures

**Description:** Applied research on cockpit information requirements and procedures for independent parallel and converging runway approaches in low visibility conditions.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace Project  
FAA – Wake Turbulence, A12b FAA – NextGen R,E&D  
FAA – NextGen – System Development – 1A13

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0930: Applied Research on Low Visibility Independent Parallel and Converging Approach																		
D-0880: Terminal and Surface Low Visibility ConOps		R	D	2009														
D-0330: Aircraft-Based Precision Approach Capability		R	D	2011														

### R-0940 Applied Research on the Roles and Responsibilities in a Shared Information Environment

**Description:** Applied research on the roles and responsibilities of users, agencies, and organizations in a shared information environment supporting security and safety assurance.

**SOPR:** DOD

**SO CR:**

**Agency Programs:** FAA – NextGen – Safety, Security, and Environment – 1A19A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0940: Applied Research on the Roles and Responsibilities in a Shared Information Environment																		
D-1070: Development of NextGen Interagency Net-Centric Security Requirements		R	D	2009														

### R-0950 Applied Research on Net-Centric Stakeholder Access to NextGen Information

**Description:** Applied research on net-centric information services necessary to ensure timely access to accurate and secure real-time information for NextGen stakeholders. The appropriate services will depend on assumptions and prior decisions about NextGen enterprise networking architecture including infrastructure services and security measures.

**SOPR:** DOD

**SO CR:**

**Agency Programs:** DOC – NOAA 4D Database Interface with FAA SWIM  
FAA – NextGen – Safety, Security, and Environment – 1A19A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0950: Applied Research on Net-Centric Stakeholder Access to NextGen Information																		
D-1070: Development of NextGen Interagency Net-Centric Security Requirements		R	D	2009														

### R-0960 Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation

**Description:** Applied research on operator and Air Navigation Service Providers (ANSP) capabilities for four-dimensional trajectory (4DT) evaluation, planning, presentation, and negotiation to support 4D flight-planning and collaborative Air Traffic Management (ATM).

**SOPR:** FAA

**SO CR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation																		
EN-0008: Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)			2011	R		E	2013											
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering			2011	R		E	2013											
EN-0017: Trajectory Negotiation - Level 3 Automation-Assisted 4DTs							2016	R		E	2018							
EN-0018: Trajectory Negotiation - Level 4 Automated 4DTs								2018	R		E	2020						
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures		R		D	2010													

## Research Activities Listing

### R-0980 Applied Research on Sensor Threat Detection and Screening Technology

**Description:** Applied research on sensors used in threat detection (i.e., Chemical, Biological, Radiological, Nuclear and High Yield Explosive [CBRNE], weapons, behavior recognition, intruder facility access, and perimeter breach) and screening technology for use in aviation facilities.

**SOPR:** DHS

**Agency Programs:** DHS – S&T Explosives IPT Research Programs  
DHS – S&T Chem Bio IPT Research Programs

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0980: Applied Research on Sensor Threat Detection and Screening Technology																		
D-2111: Threat Detection and Screening Technologies																		

### R-0990 Applied Research on Aircraft Support Systems

**Description:** Applied research on aircraft support systems that will reduce the need for service personnel to be present airside to prepare aircrafts for flight.

**SOPR:** Industry

**Agency Programs:** DHS – TSA SIDA II DHS – S&T People  
Screening IPT Research Program

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-0990: Applied Research on Aircraft Support Systems																		
EN-1002: Non-Cooperative Surveillance - GSE																		
EN-1005: Cooperative Surveillance - Ground Equipment																		

### R-1000 Applied Research on Efficient Baggage Screening Design Models

**Description:** Applied research of baggage screening design models (including remote screening locations) to facilitate passenger throughput and minimize airport configuration changes.

**SOPR:** DHS

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1000: Applied Research on Efficient Baggage Screening Design Models																		
EN-4311: Cargo & Mail Screening - National Standards																		
EN-5030: Remote Check-In Processing Systems																		

### R-1030 Applied Research on Environmental Metrics for New and Alternative Vehicle Classes

**Description:** Applied research on environmental impact metrics for new and alternative vehicle classes, including but not limited to rotorcraft and supersonic business jets to support definition of environmental metrics for new vehicles.

**SOPR:** NASA

**Agency Programs:** FAA - NextGen Environmental  
Research-Aircraft Technologies, Fuels, and  
Metrics, A13b FAA - NextGen Environment &  
Energy - Advanced Noise and Emissions  
Reduction, 1A09C NASA/ARMD/Fundamental  
Aeronautics/Supersonic/Subsonic Rotary Wing

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1030: Applied Research on Environmental Metrics for New and Alternative Vehicle Classes																		
EN-6035: Environmentally Improved Aircraft Airframe and Engines - Level 1																		
D-2110: Environmental Metrics of New and Alternative Vehicle Classes																		

### R-1040 Applied Research on the Virtual Tower Capability

**Description:** Applied research on a staffed and automated virtual tower capability that will support the expansion of air traffic services to additional airports while enhancing Air Navigation Service Providers (ANSP) productivity.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/Airspace Systems Program

**SO CR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1040: Applied Research on the Virtual Tower Capability																		
D-1360: Virtual Tower Capability																		

### R-1050 Applied Research on Airspace Assignment Methods

**Description:** Applied Research on airspace assignment methods for workforce operations in the NextGen environment.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1050: Applied Research on Airspace Assignment Methods																		
D-1090: Dynamic Airspace Reconfiguration																		

### R-1060 Applied Research on NextGen Team Size Optimization

**Description:** Applied research to understand NextGen optimal team sizes and skill set compositions to support staff management and facility design.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1060: Applied Research on NextGen Team Size Optimization																		
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1																		
EN-0034: Trajectory Management Decision Support - Level 1																		
EN-0035: Separation Management Decision Support - Level 1																		
EN-0300: Networked Air Navigation Support Facilities																		

### R-1080 Applied Research on the Service Benefits and Costs for NextGen Aircraft Capabilities

**Description:** Applied research on the service benefits and costs for NextGen aircraft capabilities. This research will include possible selections of incentive based programs or mandates for airborne capabilities in the 2020 timeframe.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/ NGATS ATM Airspace  
Project NASA/NGATS ATM Airportal Project  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1080: Applied Research on the Service Benefits and Costs for NextGen Aircraft Capabilities																		
D-1200: Guidance for Trajectory-Based Procedures																		

### R-1120 Applied Research on Automated Flight and Flow Evaluation and Resolution Capabilities

**Description:** Applied research on collaborative automated flight and flow evaluation and resolution capabilities supporting flight operators and Air Navigation Service Providers (ANSP's) negotiation objectives and trajectory preferences to balance priorities, including roles and responsibilities.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1120: Applied Research on Automated Flight and Flow Evaluation and Resolution Capabilities																		
D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace																		
D-0420: NAS-Wide Aggregate Flow Models																		



## Research Activities Listing

### R-1130 Applied Research on an Automated Capacity Management Capability

**Description:** Applied research on a capability to automate the detection, notification, coordination, and resolution of problems related to capacity management.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace Project

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1130: Applied Research on an Automated Capacity Management Capability																		
D-0420: NAS-Wide Aggregate Flow Models							2014	R	D	2016								

### R-1150 Applied Research on Airframe and Aircraft System Weather Mitigation Technique Benefits

**Description:** Applied research on the operational benefits of airframe and aircraft system mitigation techniques under various weather conditions.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1150: Applied Research on Airframe and Aircraft System Weather Mitigation Technique Benefits																		
D-2123: Aircraft Systems Weather Mitigation Requirements							2014	R	D	2016								

### R-1160 Applied Research on Cargo/Mail Threat Detection and Screening Technologies

**Description:** Applied research on detecting and identifying cargo and mail threats.

**SOPR:** DHS

**Agency Programs:** DHS – S&T Cargo IPT Research Programs

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1160: Applied Research on Cargo/Mail Threat Detection and Screening Technologies																		
D-2111: Threat Detection and Screening Technologies																		

### R-1170 Applied Research on Flight Risk Assessment Algorithms

**Description:** Applied research on overall NextGen flight risk assessment algorithms based on threat factors, Air Traffic Management (ATM) flight object data, security-relevant flight data, and the Federal Aviation Administration (FAA) universal grid concept to support an alternatives analysis and selection decision for flight risk prediction and monitoring capabilities.

**SOPR:** DHS

**Agency Programs:** FAA - Security Integration Tool Suite (SITS)

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1170: Applied Research on Flight Risk Assessment Algorithms																		
D-1560: Flight Risk Assessment Algorithms																		

### R-1190 Applied Research on Certification Methods, Requirements, and Standards for UASs

**Description:** Applied research on safety certifications for control systems, sense and avoid capabilities, collision avoidance capabilities, and emergency procedures as they apply to Unmanned Aerial Systems (UAS).

**SOPR:** DOD

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1190: Applied Research on Certification Methods, Requirements, and Standards for UASs																		
EN-0039: UAS Detail Operation Concept																		
EN-3054: Improved Reliability and Airworthiness of Aircraft - Level 1																		
EN-3055: Improved Reliability and Airworthiness of Aircraft - Level 2																		

## Research Activities Listing

### R-1230 Applied Research on Weather and Wake Impacts for En Route Operations

**Description:** Applied research to incorporate weather and wake impacts into reduced en route separation standards and overall en route operational procedures.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen Wake Program

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1230: Applied Research on Weather and Wake Impacts for En Route Operations</b>																		
EN-0035: Separation Management Decision Support - Level 1				2011	R	E	2013											
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures				2011	R	E	2013											
EN-0038: Separation Management Decision Support - Level 2										2016	R	E	2018					
D-1220: Development of Weather Hazard Severity Indices				R	D	2009												
D-1680: Advanced Wake Sensing Capabilities				R	D	2011												

### R-1240 Applied Research on Low Visibility Dependent Multiple Approach Procedures

**Description:** Applied research on technologies and procedures supporting very closely spaced parallel runway procedures in low visibility.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace Project NASA/ARMD/ASP/NGATS ATM Airportal Project FAA - New ATM Requirement, 1A14X-6 FAA - Operations Concept Validation - Validation Modeling, 1A14X-7 FAA - NextGen - Flexible Terminals and Airports - 1A18A FAA - NextGen Wake Program

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1240: Applied Research on Low Visibility Dependent Multiple Approach Procedures</b>																		
D-0880: Terminal and Surface Low Visibility ConOps				R	D	2009												
D-0330: Aircraft-Based Precision Approach Capability				R	D	2011												

### R-1260 Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training

**Description:** Applied research on risk-reducing systems interfaces, procedures, and training to reduce human error for the range of NextGen stakeholders.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/Airspace Systems Program  
FAA – NextGen R,E&D FAA – NextGen – System Development – 1A13

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training</b>																		
EN-3122: Reduced Controlled Flight into Terrain - Level 1						2013	R	E	2015									
EN-3123: Airborne Weather Information Technologies- Level 1															2023	R	E	
EN-3124: Reduced Controlled Flight into Terrain - Level 2															2023	R	E	
EN-3125: Airborne Weather Information Technologies- Level 2															2023	R	E	
D-1710: Risk Reducing Interfaces, Procedures, and Training				2010	R	D	2012											

### R-1270 Applied Research on Advanced Materials and Design for New Aircraft

**Description:** Applied research on new materials and advanced aircraft designs supporting long term structural airworthiness of an aircraft.

**SOPR:** NASA

**Agency Programs:** NASA/Aviation Safety/Aging and Durability  
NASA/Fundamental Aeronautics/Subsonic Rotary Wing

**SOCR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1270: Applied Research on Advanced Materials and Design for New Aircraft																		
D-2163: Reliability and Airworthiness of Aircraft Design Guidelines				2011	R		D	2013										

### R-1280 Applied Research on System Health Management

**Description:** Applied research on system health management to support NextGen equipage decisions.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/Aviation Safety  
Program/Integrated Vehicle Health  
Management

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1280: Applied Research on System Health Management																		
D-2165: Vehicle Systems Health Management Design Guidelines				2011	R		D	2013										
D-2173: Ground-Based Systems Health Management Design Guidelines				2011	R		D	2013										

### R-1290 Applied Research for Upset Condition Prevention and Recovery

**Description:** Applied research of adaptive control systems that support the prevention and recovery from upset condition. Adaptive control systems are expected to receive multiple inputs for broad situation awareness and provide real-time control or advisory services that adapt and respond to rapidly changing conditions.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/Aviation Safety  
Program/Integrated Resilient Aircraft Controls

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1290: Applied Research for Upset Condition Prevention and Recovery																		
EN-3127: Reduce Airborne Icing-Related Incidents - Level 1						2013	R		E	2015								
EN-3126: Improved Aircraft Upset Prevention and Recovery															2023	R		E
EN-3128: Reduce Airborne Icing-Related Incidents - Level 2															2023	R		E

### R-1300 Applied Research on Modular Components used in Threat Detection and Screening Technologies

**Description:** Applied research on modular components for screening passengers and carry-on baggage within advanced threat detection systems (weapons, Chemical, Biological, Radiological, Nuclear, and High Yield Explosive [CBNE] agents) that will support threat detection capabilities for passengers and carry-on baggage.

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS – S&T Explosives IPT Research Programs  
DHS – S&T Chem Bio IPT Research Programs

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1300: Applied Research on Modular Components used in Threat Detection and Screening																		
D-2111: Threat Detection and Screening Technologies								R	D	2009								

### R-1310 Applied Research on a Checked Baggage Threat Detection and Screening System

**Description:** Applied research on a comprehensive threat detection and automated screening capability supporting checked baggage systems implementation.

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS – S&T Explosives IPT Research Programs  
DHS – S&T Chem Bio IPT Research Programs

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1310: Applied Research on a Checked Baggage Threat Detection and Screening System																		
D-2111: Threat Detection and Screening Technologies								R	D	2009								

## Research Activities Listing

### R-1330 Applied Research on Noise and Emissions Analysis Tools

**Description:** Applied research on noise and emissions analysis tools for all classes of air vehicles to provide a higher-fidelity capability to data-driven decision-making environmental management system tool suites.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA - NextGen Environment & Energy - Advanced Noise and Emissions Reduction, 1A09C FAA - Environment and Energy - A13a  
FAA - NextGen Environmental Research-Aircraft Technologies, Fuels, and Metrics, A13b NASA/ARMD/Fundamental Aeronautics/Subsonic Fixed Wing  
NASA/ARMD/Fundamental Aeronautics/Supersonics  
NASA/ARMD/Fundamental Aeronautics/Subsonic Rotary Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1330: Applied Research on Noise and Emissions Analysis Tools																		
EN-6048: Environmental Impact Modeling and Assessment - Level 2									2016	R		E	2018					
D-1020: NextGen (N+1) EMS Analysis Tools							2014	R		D	2016							

### R-1340 Applied Research on Aviation Procedures to Reduce Environmental Impacts

**Description:** Applied research on aircraft surface movement, arrival and departure, and en route procedures to enhance and promote fuel efficiency that optimizes energy intensity and reduces environmental impacts.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environment & Energy – Advanced Noise and Emissions Reduction, 1A09C NASA/ARMD/ASP  
NASA/ARMD/Fundamental Aeronautics/Subsonic Fixed Wing  
NASA/ARMD/Fundamental Aeronautics/Subsonic Rotary Wing  
FAA – Environment and Energy - A13a

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1340: Applied Research on Aviation Procedures to Reduce Environmental Impacts																		
D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts				2011	R		D	2013										

### R-1370 Applied Research on the Operational Concept for UASs in Trajectory-Based Airspace

**Description:** Applied research on Unmanned Aircraft System's (UAS) operational and air-ground systems integration into trajectory-based airspaces to support alternative selection and regulation decisions on UAS access and transparency requirements.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1370: Applied Research on the Operational Concept for UASs in Trajectory-Based Airspace																		
EN-0039: UAS Detail Operation Concept			2010	R		E	2012											

### R-1380 Applied Research on Rotorcraft Configurations

**Description:** Applied research on rotorcraft technologies with low environmental impact and increased performance.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/Fundamental Aeronautics/Subsonic Rotary Wing

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1380: Applied Research on Rotorcraft Configurations																		
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)									2016	R	E	2018						

### R-1390 Applied Research on Off-Airport Passenger and Baggage Processing

**Description:** Applied research on off-airport passenger and baggage processing to support increased throughput.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1390: Applied Research on Off-Airport Passenger and Baggage Processing																		
EN-5030: Remote Check-In Processing Systems				2011	R	E	2013											
EN-4116: Off Airport Passenger and Baggage Security Screening (RTSS)							2014	R	E	2016								

### R-1410 Applied Research on Noise, Emissions, and Performance Trade-offs for N+2 Aircraft

**Description:** Applied research to understand the realizable benefits and tradeoffs in the noise, emissions, and performance (fuel burn and take-off and landing field length) “corners of the design space” for the generation after next (N+2) advanced configuration unconventional subsonic aircraft.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1410: Applied Research on Noise, Emissions, and Performance Trade-offs for N+2 Aircraft																		
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)									2016	R	E	2018						

### R-1430 Applied Research on Human/Automation Roles in High-Density Surface Operations

**Description:** Applied research on alternative aircraft/ground and human/automation roles and responsibilities to support an alternative selection for taxi instruction information and procedures enabling effective high-density surface operations via data messaging. Research will include the concept of communicating and executing taxi operations using data messaging.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project FAA - NextGen Demos and  
Infrastructure Development

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1430: Applied Research on Human/Automation Roles in High-Density Surface Operations																		
EN-0023: Surface Movement - Detail Operational Concept				R	E	2011												
D-1200: Guidance for Trajectory-Based Procedures				D	2008													
D-0360: Requirements for Taxi Instructions Submission				R	D	2010												

### R-1440 Applied Research on Complex Systems Validation and Verification

**Description:** Applied research on the methods and algorithms to support the validation and verification of complex systems. Complex systems provide multiple functions that support many different operating models, environments and technologies and therefore require more advanced and integrated validation and verification methods and algorithms beyond those used for less complex systems. This research will support the development of complex systems, their risk assessment and eventual certification decisions.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/Airspace Systems Program  
NASA/ARMD/AvSafe

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1440: Applied Research on Complex Systems Validation and Verification																		
D-2100: Complex System Validation and Verification Tools and Techniques				R	D	2010												

## Research Activities Listing

### R-1450 Applied Research into Generation After Next (N+2) Vehicle Technologies

**Description:** Applied research into generation after next (N+2) subsonic fixed wing vehicle technologies that reduce noise and emissions (greenhouse gases and emissions with adverse impact on air quality) at the source. Potential technologies include wing shielding, low-noise airframe, alternative fuels and combustion concepts, embedded engines, adaptive and lightweight structures, efficient engines, and low-drag configurations.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1450: Applied Research into Generation After Next (N+2) Vehicle Technologies																		
EN-5047: Airfield Design Standards							2015	R		E	2017							
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)								2016	R		E	2018						

### R-1460 Applied Research on Common NextGen Automation Platform

**Description:** Applied research on common automation platforms, networking and display systems to support cost-effective automated and integrated decision support systems and information technology infrastructure.

**SOPR:** FAA

**SO CR:**

**Agency Programs:** FAA - NextGen - Network Facilities - 1A120A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1460: Applied Research on Common NextGen Automation Platform																		
EN-0100: Surface Movement Decision Support - Level 1 Initial				R		E	2011											
EN-1016: Enterprise Networks Infrastructure Services Standards				R		E	2011											
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1				2011	R		E	2013										
EN-0034: Trajectory Management Decision Support - Level 1				2011	R		E	2013										
EN-0035: Separation Management Decision Support - Level 1				2011	R		E	2013										

### R-1520 Applied Research on the Role of Human Forecasters and Automated Systems

**Description:** Applied research on the role of human forecasters and operational expertise to augment the value of automatically generated Four-Dimensional (4D) weather grids.

**SOPR:** DOC

**SO CR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1520: Applied Research on the Role of Human Forecasters and Automated Systems																		
D-2113: Operating Procedures for Human Forecasters using Automated Systems				R	D	2009												

### R-1570 Applied Research on Overland Supersonic Cruise Aircraft

**Description:** Applied research on environmentally compatible (i.e., addressing sonic boom, community noise, and emissions) and economically viable overland supersonic cruise aircraft.

**SOPR:** NASA

**SO CR:**

**Agency Programs:** FAA - NextGen Environmental Research -  
Continuous Low Energy, Emissions, and Noise  
(CLEEN) Technologies, A13.b FAA - NextGen  
Environment & Energy - Advanced Noise and  
Emissions Reduction, 1A09C  
NASA/ARMD/Fundamental  
Aeronautics/Supersonics

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1570: Applied Research on Overland Supersonic Cruise Aircraft																		
EN-6036: Environmentally Improved Airframe and Engine Technology - Level 2 (N+2)								2016	R		E	2018						

## Research Activities Listing

### R-1580 Applied Research on an Airborne Collision Avoidance System

**Description:** Applied Research on an airborne collision avoidance system as a safety backup for NextGen operations. This research may identify new algorithms and avionics based on Automatic Dependent Surveillance-Broadcast (ADS-B) technology.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen High-Density  
Arrival/Departures

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1580: Applied Research on an Airborne Collision Avoidance System																		
D-2147: Airborne Collision Avoidance Back-up System																		

### R-1590 Applied Research for Required Oceanic Flight Profile Information

**Description:** Applied research to define the requirements for determining optimal flight profile information to support an alternative selection for altitude changes and co-altitude pair-wise maneuvers at reduced separation in oceanic airspace.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen-Trajectory-Based Operations-  
1A14A

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1590: Applied Research for Required Oceanic Flight Profile Information																		
D-2131: Required Oceanic Flight Profile Information																		

### R-1600 Applied Research on Aircraft-Based CNS Technologies in Self-Separation Airspace

**Description:** Applied research on the performance level requirements for aircraft-based Communication, Navigation, and Surveillance (CNS) technologies in self-separation operations.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1600: Applied Research on Aircraft-Based CNS Technologies in Self-Separation Airspace																		
D-2137: Performance Requirements for Aircraft-Based CNS Technologies in Self Separation																		

### R-1620 Applied Research on Spacing Management in Congested En Route Airspace

**Description:** Applied research on initial traffic spacing management alternatives in congested en route airspace to support an alternative selection on Trajectory Management, merging, spacing and metering.

**SOPR:** NASA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project FAA - NextGen Demos and  
Infrastructure Development FAA - NextGen -  
High Density Arrival/Departures - 1A16A

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1620: Applied Research on Spacing Management in Congested En Route Airspace																		
EN-0016: Separation/Trajectory Management Detail Operational Concept																		
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1																		
EN-0034: Trajectory Management Decision Support - Level 1																		
EN-0035: Separation Management Decision Support - Level 1																		
EN-0036: Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited																		
EN-0037: Trajectory Management Decision Support - Level 2																		
EN-0038: Separation Management Decision Support - Level 2																		
EN-0180: Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic																		



## Research Activities Listing

### R-1630 Applied Research on Flow Corridor Operational Concepts

**Description:** Applied research on technologies, operational concepts, and procedures to support the selection of the preferred implementation of flow corridors.

**SOPR:** FAA

**SOGR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project FAA – NextGen – System Development  
– 1A13

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1630: Applied Research on Flow Corridor Operational Concepts</b>																		
<b>EN-0036: Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited</b>									2016	R		E	2018					
<b>EN-0180: Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic</b>													2020	R		E	2022	
<b>D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures</b>				R		D	2011											

### R-1750 Applied Research on the Policy and Procedures to Reduce Aviation Environmental Impact

**Description:** Applied research of potential policies and procedures for aircraft surface movement, arrival and departure, and en route procedures specifically designed to reduce noise and air quality impacts, and fuel burn.

**SOPR:** FAA

**SOGR:**

**Agency Programs:** FAA – Environment and Energy - A13a FAA –  
NextGen Environmental Research—Aircraft  
Technologies, Fuels, and Metrics, A13b FAA –  
NextGen Environment & Energy – Advanced  
Noise and Emissions Reduction, 1A09C  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1750: Applied Research on the Policy and Procedures to Reduce Aviation Environmental Impact</b>																		
<b>D-1740: Environmental Impact Management Capability</b>					2011	R		D	2013									

### R-1760 Applied Research on the Methodologies and Metrics to Assess Climate Change Impacts

**Description:** Applied research on measurement methodologies and metrics to determine how aviation generated particulate matter and hazardous air pollutants impact health, visibility, and global climate.

**SOPR:** FAA

**SOGR:**

**Agency Programs:** FAA – Environment and Energy - A13a FAA –  
NextGen Environmental Research—Aircraft  
Technologies, Fuels, and Metrics, A13b

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1760: Applied Research on the Methodologies and Metrics to Assess Climate Change Impacts</b>																		
<b>EN-6033: Science and Metrics of Local Emissions - Level 2 Advanced</b>				R		E	2011											
<b>EN-6039: Enhanced Global Climate Metrics</b>				R		E	2011											
<b>EN-6053: Science of Global Climate - Level 2 Advanced</b>				R		E	2011											

### R-1780 Applied Research on Tools and Metrics to Model the Impacts of Emissions

**Description:** Applied research on a robust database to enable assessment of environmental impacts resulting from particulate matter and hazardous air pollutant emissions from commercial aviation operations.

**SOPR:** FAA

**SOGR:**

**Agency Programs:** FAA – Environment and Energy - A13a FAA –  
NextGen Environmental Research—Aircraft  
Technologies, Fuels, and Metrics, A13b  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-1780: Applied Research on Tools and Metrics to Model the Impacts of Emissions</b>																		
<b>EN-6048: Environmental Impact Modeling and Assessment - Level 2</b>									2016	R		E	2018					
<b>D-1020: NextGen (N+1) EMS Analysis Tools</b>							2014	R		D	2016							

## Research Activities Listing

### R-1800 Applied Research on a Low Frequency GBNS

**Description:** Applied research for developing a Ground-Based Navigation System (GBNS) to support the Global Navigation Satellite System (GNSS) backup strategy. This research will seek to improve the current capabilities provided by today's ground-based, Low Frequency Positioning, Navigation, and Timing (PNT) systems, in terms of accuracy, integrity, timing, and data handling capacity, in order to provide users with a complementary system that meets the robust PNT needs of NextGen.

**SOPR:** DOT

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1800: Applied Research on a Low Frequency GBNS																		
D-0250: PNT Complementary and Backup System Strategy													2021	R		D		2023

### R-1810 Applied Research on a Low Cost Inertial Navigation System (INS)

**Description:** Applied Research for developing a Low Cost Inertial Measurement Unit to support the Global Navigation Satellite System (GNSS) backup strategy. This low cost inertial element, tightly coupled with GNSS, would provide improved signal to noise ratio that could be achieved with a corresponding improvement in tolerance to interference and create a multiple phenomenology system to provide the necessary Positioning, Navigation, and Timing (PNT) robustness to meet NextGen needs.

**SOPR:** DOD

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-1810: Applied Research on a Low Cost Inertial Navigation System (INS)																		
D-0250: PNT Complementary and Backup System Strategy													2021	R		D		2023

### R-2112 Applied Research on Weather Integration into NextGen Decision Making

**Description:** Applied research on the most effective methodologies, algorithms, and tools for the integration of weather information into NextGen decision-making such as: translation of weather's impact on operations, operational metrics development, determination of NextGen relevant weather information, basic mathematical research into optimization methodologies, operational research analysis, techniques for the presentation of probabilistic information to humans and automation, characterization of hazardous weather phenomena (e.g., estimation of aircraft-specific weather hazard levels, pilot likelihood to deviate, permeability of weather), and benefits pool estimation

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2112: Applied Research on Weather Integration into NextGen Decision Making																		
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1				R		E												
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2								2015	R		E							
EN-2682: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3												2019	R		E			2021

### R-2114 Applied Research on Improved Weather Sensing and Forecasting Models

**Description:** Applied research on improved models for weather sensing and forecasting relevant to NextGen decision-making during convective and winter weather, turbulence, icing, clouds, visibility, volcanic ash dispersion, space weather, environmental factors (noise, emissions and hazardous release dispersion, upper atmospheric climate effects), and wake vortices

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2114: Applied Research on Improved Weather Sensing and Forecasting Models																		
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures				2011	R		E											
EN-2500: Improve Weather Models - Level 1				2011	R		E											
EN-2501: Improve Weather Models - Level 2								2015	R		E							

## Research Activities Listing

### R-2116 Applied Research on Real-time Airport Gate Assignment

**Description:** Applied research to evaluate the feasibility and benefits on-demand assignment of airport gates to arriving aircraft, supporting real-time, common use of airport infrastructure. Research is needed to evaluate the operational and technical feasibility of the concept, as well as any infrastructure, business model, and governance changes that may be needed for implementation.

**SOPR:** NASA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2116: Applied Research on Real-time Airport Gate Assignment																		
EN-5026: Design Guidelines for NextGen Airport Passenger Terminal Buildings						2013	R		E			2015						

### R-2118 Applied Research on NextGen Lighting Systems

**Description:** Applied research on new Approach Light Systems (ALS) technologies and the attributes such as intensity, spectral variation, and mean time between failures needed to meet operational requirements. Legacy ALS in the National Airspace System (NAS) is beyond their 20 year economic service life. Maintenance and support costs are increasing, and maintaining availability is becoming exceedingly difficult. All legacy ALS are based on incandescent lamps, which are very inefficient compared to other advanced lighting technologies, such as Light Emitting Diodes (LEDs). Current LED technologies are incapable of producing the required intensity of the incandescent lamps found in some legacy ALS.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2118: Applied Research on NextGen Lighting Systems																		
D-2121: NextGen ALS							2014	R		D			2016					

### R-2121 Applied Research of Human Performance Models

**Description:** Applied research to support human performance models that accurately capture human variability and human error in highly automated NextGen systems.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen R, E&D FAA – NextGen System Development – 1A13

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2121: Applied Research of Human Performance Models																		
EN-3060: Improved Operational Decision Aids - Airborne Level 1						2013	R		E									
EN-3068: Improve Operational Decision Aids - Ground Level 1						2013	R		E									
EN-3110: Ensure the Availability and Accessibility of Required Information						2013	R		E									
EN-3111: Increase the Usefulness and Understandability of Information						2013	R		E									
EN-3112: Maintain Appropriate Human Engagement						2013	R		E									
EN-3122: Reduced Controlled Flight into Terrain - Level 1						2013	R		E									
EN-3061: Improved Operational Decision Aids - Airborne Level 2															2023	R		E
EN-3069: Improve Operational Decision Aids - Ground Level 2															2023	R		E
EN-3123: Airborne Weather Information Technologies- Level 1															2023	R		E
EN-3124: Reduced Controlled Flight into Terrain - Level 2															2023	R		E
EN-3125: Airborne Weather Information Technologies- Level 2															2023	R		E
D-1710: Risk Reducing Interfaces, Procedures, and Training						2010	R		D				2012					
D-2155: Availability and Accessibility of Required Information Design Guidelines						2011	R		D				2013					
D-2157: Usefulness and Understandability of Information Design Guidelines						2011	R		D				2013					
D-2159: Appropriate Human Engagement Design Guidelines						2011	R		D				2013					
D-2161: Operational Decision Aids Design Guidelines						2011	R		D				2013					

## Research Activities Listing

### R-2122 Applied Research on System Risk Assessment and Management Models

**Description:** Applied research to investigate system risk assessment and management models addressing functional allocation across flight operator and Air Navigation Service Providers (ANSP) automation.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/Aviation Safety Program FAA – NextGen R,E&D FAA – NextGen System Development – 1A13

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2122: Applied Research on System Risk Assessment and Management Models																		
D-1700: System Risk Assessment and Management Models																		

### R-2124 Applied Research on Ultra-Low Sulfur Conventional Jet Fuels

**Description:** Applied research on the feasibility of Ultra-Low Sulfur (ULS) fuels from conventional fuel sources to reduce impacts on air quality.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA - NextGen Environmental Research-Aircraft Technologies, Fuels, and Metrics, A13b FAA – NextGen Environment and Energy – advanced noise and emissions reduction, 1A09C NASA/ARMD/Fundamental Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2124: Applied Research on Ultra-Low Sulfur Conventional Jet Fuels																		
D-2139: ULS Conventional Jet Fuels																		

### R-2126 Applied Research on Airframe Designs to Accelerate Wake Vortex Decay

**Description:** Applied research on airframe design technologies that accelerate wake vortex decay.

**SOPR:** Industry

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2126: Applied Research on Airframe Designs to Accelerate Wake Vortex Decay																		
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures																		
D-1010: NextGen Vehicle Technologies																		

### R-2128 Applied Research on Integrated Voice/Data and Air/Ground Network Communications

**Description:** Applied research on three inter-related topics: (a) digital voice to the cockpit, (b) voice/data integration and ground/air integration, and (c) a standard network layer (such as IP, internet protocol) to the cockpit. Digital voice factors include bandwidth limitations, reliability, and compatibility with ground networks. Exploration of voice/data integration should address data segregation concerns (for example, if or how safety-critical and advisory data should be mixed). A major aspect of ground/air integration is compatible protocols between those two network segments. The idea of IP to the cockpit is related to this, as it would strongly facilitate ground/air integration. IP to the cockpit could also reduce costs and increase flexibility in deploying services to the flight crew, by providing a standardized network "backbone" protocol that is widely known, possibly avoiding an alternative of many complicated, service-specific low-level protocols. New services could potentially be deployed to the cockpit more quickly and easily. IP could also serve as a framework for digital voice and voice/data integration.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2128: Applied Research on Integrated Voice/Data and Air/Ground Network Communications																		
EN-1170: Integrated Ground and Air Network for Voice/Data																		

## Research Activities Listing

### R-2130 Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training

**Description:** Applied research on risk-reducing systems interfaces, procedures, and training to reduce human error for the range of NextGen stakeholders.

**SOPR:** NASA

**Agency Programs:**

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training</b>																		
EN-3110: Ensure the Availability and Accessibility of Required Information					2013	R		E		2015								
EN-3111: Increase the Usefulness and Understandability of Information					2013	R		E		2015								
EN-3112: Maintain Appropriate Human Engagement					2013	R		E		2015								
EN-3122: Reduced Controlled Flight into Terrain - Level 1					2013	R		E		2015								
EN-3123: Airborne Weather Information Technologies- Level 1															2023	R		E
EN-3124: Reduced Controlled Flight into Terrain - Level 2															2023	R		E
EN-3125: Airborne Weather Information Technologies- Level 2															2023	R		E
D-1710: Risk Reducing Interfaces, Procedures, and Training		2010	R			D			2012									
D-2155: Availability and Accessibility of Required Information Design Guidelines			2011	R			D		2013									
D-2157: Usefulness and Understandability of Information Design Guidelines			2011	R			D		2013									
D-2159: Appropriate Human Engagement Design Guidelines			2011	R			D		2013									

### R-2132 Applied Research on Contributing Factor Analysis

**Description:** Applied research on contributing factor analysis to support analysis tool development for safety assurance and Safety Risk Management (SRM) using Aviation Safety Information Analysis and Sharing (ASIAS) capabilities.

**SOPR:** NASA

**Agency Programs:**

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-2132: Applied Research on Contributing Factor Analysis</b>																		
EN-3024: Advanced Incident Contributing Factor Analysis			R			E		2010										
D-2149: Contributing Factor Analysis Tools			D		2008													

### R-2134 Applied Research on Prognostic Risk Management

**Description:** Applied research on prognostic risk management to support analysis tool development for safety assurance and safety risk management using Aviation Safety Information Analysis and Sharing (ASIAS) capabilities.

**SOPR:** NASA

**Agency Programs:**

**SOOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>R-2134: Applied Research on Prognostic Risk Management</b>																		
D-2151: Prognostic Risk Management Tools			D		2008													

### R-2136 Applied Research on Fault Management

**Description:** Applied research on fault management to support analysis tool development for safety assurance and Safety Risk Management (SRM) using Aviation Safety Information Analysis and Sharing (ASIAS) capabilities.

**SOPR:** NASA

**Agency Programs:**

**SOOCR:**

## Research Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2136: Applied Research on Fault Management																		
EN-3027: Improved Fault Management																		
D-2153: Fault Management Tools																		

### R-2138 Applied Research on Human Error Using Automated Systems

**Description:** Applied research on human-system performance models that will accurately capture human variability and error using NextGen automated systems.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen R, E&D FAA - NextGen System Development - 1A13

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
R-2138: Applied Research on Human Error Using Automated Systems																		
EN-3060: Improved Operational Decision Aids - Airborne Level 1																		
EN-3068: Improve Operational Decision Aids - Ground Level 1																		
EN-3110: Ensure the Availability and Accessibility of Required Information																		
EN-3111: Increase the Usefulness and Understandability of Information																		
EN-3112: Maintain Appropriate Human Engagement																		
EN-3122: Reduced Controlled Flight into Terrain - Level 1																		
EN-3061: Improved Operational Decision Aids - Airborne Level 2																		
EN-3069: Improve Operational Decision Aids - Ground Level 2																		
EN-3123: Airborne Weather Information Technologies- Level 1																		
EN-3124: Reduced Controlled Flight into Terrain - Level 2																		
EN-3125: Airborne Weather Information Technologies- Level 2																		
D-1710: Risk Reducing Interfaces, Procedures, and Training																		
D-2155: Availability and Accessibility of Required Information Design Guidelines																		
D-2157: Usefulness and Understandability of Information Design Guidelines																		
D-2159: Appropriate Human Engagement Design Guidelines																		
D-2161: Operational Decision Aids Design Guidelines																		

## Development Activities Listing

### D-0010 Coordination and Dissemination Requirements for SUAs

**Description:** Development of coordination and dissemination requirements for Special Use Airspace (SUA), to support the allocation of SUA.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – Collaborative ATM – 1A17A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0010: Coordination and Dissemination Requirements for SUAs																		
EN-0170: SUA Management Decision Support - Level 1																		
EN-0171: SUA Management Decision Support - Level 2																		

### D-0030 Planning, Collaboration, and Coordination Functions for Airspace Security

**Description:** Development of the planning, collaboration, and coordination functions for airspace security supporting flight risk identification, alert notification, decision-making collaboration, and response coordination systems.

## Development Activities Listing

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – Safety, Security and Environment – 1A19A DHS – AMOSS  
DHS/FAA – ADAPT

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0030: Planning, Collaboration, and Coordination Functions for Airspace Security</b>																		
<b>EN-4500: Flight Risk Management System - Level 1 Static</b>					2010	D	E	2012										
<b>EN-4510: Security Airspace Planning and Management - Level 1</b>					2010	D	E	2012										
<b>EN-4511: Security Airspace Planning and Management - Level 2</b>							2012	D	E	2014								
<b>EN-4521: Flight Risk Management System - Level 2 Dynamic</b>								2014	D	E	2016							
<b>EN-4512: Security Airspace Planning and Management - Level 3</b>																2023	D	E

### D-0150 Collaborative Negotiation Capabilities for Expanded Oceanic Track Entry Points

**Description:** Development of collaborative negotiation capabilities for expanded oceanic track entry points to support enhanced oceanic efficiency improvements.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Demos and Infrastructure Development

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0150: Collaborative Negotiation Capabilities for Expanded Oceanic Track Entry Points</b>																		
<b>R-0130: Applied Research on Automation-Assisted Collaboration Capabilities</b>							R	D	2009									
<b>EN-0162: Development of Flexible Oceanic Entry Points</b>								D	E	2011								

### D-0160 SMS Standard

**Description:** Development of a national Safety Management System (SMS) standard, which will be used to ensure the operational safety of advanced concepts and technologies.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0160: SMS Standard</b>																		
<b>EN-3018: Safety Management Requirements</b>																		

### D-0170 Safety Information Sharing Environment

**Description:** Development of a safety information sharing and analysis environment.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0170: Safety Information Sharing Environment</b>																		
<b>EN-3016: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 1</b>																		
<b>EN-3036: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 2</b>																		
<b>EN-3037: Aviation Safety Information Analysis and Sharing Environment (ASIAS) - Level 3</b>																		



## Development Activities Listing

### D-0190 Threat-Vector Analysis Capability

**Description:** Develop an initial Integrated Risk Management (IRM) approach that includes the ability to collect information about potential threats to the Air Transportation System (ATS), assess and prioritize the threats to determine the overall risk, and manage potential mitigation response. This approach will support a decision to implement an IRM capability that will evaluate potential threats, determine potential impacts, and manage overall response.

**SOPR:** DHS

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0190: Threat-Vector Analysis Capability																		
EN-4520: Integrated Risk Management (IRM) System																		

### D-0240 Facility and Networking Alternatives

**Description:** Development of facility and networking alternatives for decoupling service delivery from facility geographic location.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – Network Facilities – 1A120A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0240: Facility and Networking Alternatives																		
R-0230: Applied Research on Facility-Independent Techniques for Networked Facility Operations																		
EN-0019: Virtual Tower - Detail Operational Concept																		
EN-0300: Networked Air Navigation Support Facilities																		

### D-0250 PNT Complementary and Backup System Strategy

**Description:** Development of Positioning, Navigation, and Timing (PNT) complementary/ backup strategy to support NextGen PNT Architecture Strategy. Additional exploration and analysis are needed to realize NextGen capabilities and support sound U.S. Government investment decisions.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0250: PNT Complementary and Backup System Strategy																		
R-1800: Applied Research on a Low Frequency GBNS																		
R-1810: Applied Research on a Low Cost Inertial Navigation System (INS)																		
EN-1101: Enhanced NextGen PNT Services																		

### D-0260 Development of NextGen Interagency NCI Requirements

**Description:** Development of NextGen interagency Net-Centric Infrastructure (NCI) requirements, including but not limited to: infrastructure equipment and platforms (in generic terms), information sharing strategies, exchange protocols, and metadata standards. This focuses on high-level requirements for the low-level network; it does not include security and information services addressed in more detail by other development items.

**SOPR:** DOD

**Agency Programs:** FAA - NextGen - SWIM FAA - NextGen - Collaborative ATM - 1A17A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0260: Development of NextGen Interagency NCI Requirements																		
R-0510: Applied Research on Air and Ground Separation Management Architectures																		
R-0660: Applied Research on Integrating NextGen Information into an Automated Environment																		
EN-1015: Enterprise Network Management Standards																		
EN-1016: Enterprise Networks Infrastructure Services Standards																		

## Development Activities Listing

### D-0320 Adaptive Weather Observation Capabilities

**Description:** Development of adaptive ground-, airborne-, and spaced-based weather observation capabilities (e.g., environmental parameters).

**SOPR:** DOC

**SOCR:**

**Agency Programs:** NASA/SMDFAA – NextGen – Reduce Weather Impact – 1A15A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0320: Adaptive Weather Observation Capabilities																		
EN-2250: Network-Enabled Weather Observation System - Adaptive Control					2013	D		E	2015									

### D-0330 Aircraft-Based Precision Approach Capability

**Description:** Development of an aircraft-based precision approach capability with performance similar to CAT II/III ground-based landing guidance systems.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – Flexible Terminals and Airports – 1A18A NASA/ARMD/ASP/NGATS ATM Airspace Project  
NASA/ARMD/ASP/NGATS ATM Airportal Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0330: Aircraft-Based Precision Approach Capability																		
R-0040: Applied Research on Critical NextGen Aircraft Capabilities			R		D	2011												
R-0910: Applied Research on Optimizing Overlapping Runway Occupancies			R		D	2011												
R-0930: Applied Research on Low Visibility Independent Parallel and Converging Approach			R		D	2011												
R-1240: Applied Research on Low Visibility Dependent Multiple Approach Procedures			R		D	2011												
EN-1041: Space Based Navigation System - GPS Aviation Dual Frequency				2011	D		E	2013										
EN-0106: Avionics - Delegated Separation Acknowledgement Information					2012	D		E	2014									
EN-0103: Avionics - Trajectory Management - Arrival/Departure						2013	D		E	2015								

### D-0360 Requirements for Taxi Instructions Submission

**Description:** Development of the digital transmission and onboard display requirements for providing taxi instructions used in low-visibility conditions.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0360: Requirements for Taxi Instructions Submission																		
R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions			R		D	2010												
R-1430: Applied Research on Human/Automation Roles in High-Density Surface Operations			R		D	2010												
EN-1206: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 1				2010	D		E	2012										

### D-0400 Time-Based Metering of Flows Transitioning into High-Density Terminal Areas

**Description:** Development of time-based metering of flows transitioning into high-density terminal areas.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – High Density Arrival/Departures – 1A16A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0400: Time-Based Metering of Flows Transitioning into High-Density Terminal Areas																		
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering				2011	D		E	2013										

## Development Activities Listing

### D-0420 NAS-Wide Aggregate Flow Models

**Description:** Development of National Airspace System (NAS) wide aggregate flow models supporting common situational awareness of current and forecast congestion and mitigation options among Air Traffic Management (ATM) personnel, flight operators, and flight crews.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen R,E&D FAA – NextGen – System Development – 1A13 FAA – NextGen – Collaborative ATM – 1A17A  
NASA/ARMD/ASP/NGATS ATM Airspace Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0420: NAS-Wide Aggregate Flow Models																		
R-1120: Applied Research on Automated Flight and Flow Evaluation and Resolution Capabilities						2014	R		D	2016								
R-1130: Applied Research on an Automated Capacity Management Capability						2014	R		D	2016								
EN-0036: Airspace/Capacity/Flow Contingency Management Decision Support - Level 2 Limited								2016	D		E	2018						
EN-0180: Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic											2020	D		E	2022			

### D-0440 Secure and Certified Supply Chain Entity

**Description:** Development of a Secure and Certified Supply Chain Entity (CSCE) .

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS - Shipper Certification

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0440: Secure and Certified Supply Chain Entity																		
EN-4401: CSCE			2011	D		E	2013											
EN-4403: SSCE			2011	D		E	2013											

### D-0450 Common Situational Awareness Capability

**Description:** Development of common situation awareness capability with Law Enforcement personnel (Secret Service, Federal Air Marshals, etc.) and command centers to support an implementation decision on information sharing capabilities of the Force Multiplier Program to prevent the destruction or loss of positive control of the air vehicle.

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS – Force Multiplier

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0450: Common Situational Awareness Capability																		
EN-4520: Integrated Risk Management (IRM) System			2010	D		E	2012											

### D-0460 Enterprise Airport Security Data Management System

**Description:** Development of an enterprise data management system to exchange threat information generated from security screening equipment and checkpoints to appropriate stakeholders to support an agency implementation decision.

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS – Security Technology Integration Program

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0460: Enterprise Airport Security Data Management System																		
R-0180: Applied Research on Secure Information Exchanges at Command and Control Facilities			R	2008														
EN-4210: Airport Command, Control, and Communications Center Architecture			D		E	2010												
EN-4203: Multi-Agency Security Information Sharing/Delegation Protocols			D		E	2011												
EN-4522: Unified National Aviation Command, Control and Communication Architecture											2018	D		E	2020			

## Development Activities Listing

### D-0480 Reduced Oceanic Separation Standards and Procedures

**Description:** Development of non-radar 30 mile lateral separation standards and procedures for use in Oceanic airspace.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0480: Reduced Oceanic Separation Standards and Procedures																		
R-0590: Applied Research on Optimizing Visual Flight Rule (VFR) Operations																		
EN-0301: Performance-Based Separation Standards and Procedures																		

### D-0490 5nm Non-Radar Separation Standards and Procedures

**Description:** Development of 5 mile non-radar longitudinal separation standards and procedures.

**SOPR:** FAA

**Agency Programs:** FAA - ADS-B

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0490: 5nm Non-Radar Separation Standards and Procedures																		
R-0590: Applied Research on Optimizing Visual Flight Rule (VFR) Operations																		
EN-0301: Performance-Based Separation Standards and Procedures																		

### D-0520 Trajectory Prediction Methodologies for New Vehicle Classes

**Description:** Development of methodologies to predict trajectories for new classes of vehicles, including Unmanned Aerial Systems (UAS), very light, very large, and supersonic.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – System Development –  
1A13 NASA/ARMD/ASP/NGATS ATM  
Airspace Project NASA/ARMD/Fundamental  
Aeronautics/Supersonics  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Rotary Wing

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0520: Trajectory Prediction Methodologies for New Vehicle Classes																		
EN-0039: UAS Detail Operation Concept																		
EN-0037: Trajectory Management Decision Support - Level 2																		

### D-0560 Airport Information Architecture

**Description:** Development of best practices and planning architectures for multiparty (including public and community involvement) airport development actions, supporting implementation by airport operators and communities.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0560: Airport Information Architecture																		
EN-5032: Streamlined Airport Development Processes																		

### D-0710 Baggage/Cargo/Mail Monitoring System

**Description:** Development of a baggage/cargo/mail monitoring system, which includes tracking, tamper alerting, and integrity monitoring for prescreened cargo and mail, as well as, effective containment and mitigation measures for advanced threats.

**SOPR:** DHS

**Agency Programs:** DHS – S&T Cargo IPT Research Program

**SOCR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0710: Baggage/Cargo/Mail Monitoring System																		
EN-4307: Baggage/Cargo Screening Technology - Integrated Screening System						2014	D	E	2016									

### D-0730 Security Incident Management System

**Description:** Development of a unified command, control, threat warning, and communication system to manage security incidents and to support security contingency management.

**SOPR:** DHS

**SOCR:**

**Agency Programs:** DHS – S&T Information Sharing IPT Research Program  
DHS – Incident Management IPT Research Program  
DHS – Interoperability IPT Research Program

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0730: Security Incident Management System																		
EN-4520: Integrated Risk Management (IRM) System					2010	D	E	2012										
EN-4522: Unified National Aviation Command, Control and Communication Architecture												2018	D	E	2020			

### D-0750 "Drop-In" Alternative Aviation Fuels

**Description:** Development of "drop-in" turbine engine fuel alternatives, including the identification of implementation plans, supporting an implementation decision by flight operators, aircraft manufacturers, and fuel providers.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environmental Research—  
Aircraft Technologies, Fuels, and Metrics,  
A13b FAA – NextGen Environment & Energy  
– Advanced Noise and Emissions Reduction,  
1A09C NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0750: "Drop-In" Alternative Aviation Fuels																		
R-0740: Applied Research on "Drop-in" Alternative Aviation Fuels																		
EN-6050: Available Alternative Fuels - Level 3																		
EN-6051: Available Alternative Fuels - Level 4																		

### D-0830 Trajectory Negotiation Protocols for Air and Ground Information Architectures

**Description:** Development of trajectory negotiation protocols supporting aircraft and ground information architectures.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – Trajectory-Based Operations  
– 1A14A NASA/ARMD/ASP/NGATS ATM  
Airspace Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0830: Trajectory Negotiation Protocols for Air and Ground Information Architectures																		
R-0960: Applied Research on 4D Trajectory Evaluation, Planning, Presentation and Negotiation																		
EN-0301: Performance-Based Separation Standards and Procedures																		
EN-0008: Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)																		
EN-0035: Separation Management Decision Support - Level 1																		
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering																		
EN-0017: Trajectory Negotiation - Level 3 Automation-Assisted 4DTs																		
EN-0018: Trajectory Negotiation - Level 4 Automated 4DTs																		

## Development Activities Listing

### D-0840 Weather Forecast Assessment Verification System

**Description:** Development of a real-time verification system that quantitatively assesses the accuracy, reliability, quality, and timeliness of weather forecasts (e.g., probabilistic information) to support collaborative Air Traffic Management (ATM) decision-making for trajectory-based and flexible terminal operations.

**SOPR:** DOC

**SOCR:**

**Agency Programs:** FAA - NextGen - Reduce Weather Impact - 1A15A DOC - RTVS Development DOC - 4D Database Verification

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0840: Weather Forecast Assessment Verification System</b>																		
<b>R-0100: Applied Research on Accuracy and Resolution Requirements for NextGen Weather</b>				R	D	2011												
<b>R-0110: Applied Research on the Integration of Forecast and Observational Data</b>				R	D	2011												
<b>R-0580: Applied Research for Initial Probabilistic Weather Forecasts</b>				R	D	2011												
<b>EN-2010: NextGen 4D Weather Cube Information - Level 1 Initial Operating Capability</b>				2011	D	E	2013											
<b>EN-2020: NextGen 4D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts</b>								2016	D	E	2018							
<b>EN-2030: NextGen 4D Weather Cube Information - Level 3 Full NextGen</b>												2020	D	E	2022			

### D-0850 Network-Enabled Weather Information System

**Description:** Development of a virtual, authoritative, net-centric four-dimensional weather information system that provides information tailored to Air Traffic Management (ATM) procedures, including routine (diagnostics and forecasts) and real-time, hazardous weather information.

**SOPR:** DOC

**SOCR:**

**Agency Programs:** FAA – NextGen Network Enabled Weather  
NASA/ARMD/ASP/NGATS ATM Airspace  
Project DOC – NextGen 4D Database Project  
Office DOC – 4DDB Testbed/Prototype DOC –  
Develop Aviation Component of NWS Digital  
Database DOC – Forecast Product Integration  
Techniques

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0850: Network-Enabled Weather Information System</b>																		
<b>EN-2010: NextGen 4D Weather Cube Information - Level 1 Initial Operating Capability</b>				2011	D	E	2013											
<b>EN-2020: NextGen 4D Weather Cube Information - Level 2 Adaptive Control/Enhanced Forecasts</b>								2016	D	E	2018							
<b>EN-2030: NextGen 4D Weather Cube Information - Level 3 Full NextGen</b>												2020	D	E	2022			

### D-0870 Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations

**Description:** Development of mixed equipage trajectory-based routes (e.g., Area Navigation/Required Navigation Performance [RNAV/RNP]) and advanced Optimized Profile Descent (OPD) operations to support flexible trajectory-based routing. OPDs are also known as Continuous Descent Arrivals (CDAs).

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project NASA/ARMD/ASP/NGATS ATM  
Airportal Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0870: Mixed Equipage Trajectory-Based Routes and Advanced OPD Operations</b>																		
<b>R-0340: Applied Research on 3D RNAV/RNP Procedures</b>				R	D	2009												
<b>EN-0210: Flexible Routing Flight Plan Automation - Operator</b>				D	E	2011												
<b>EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1</b>				2011	D	E	2013											
<b>EN-0034: Trajectory Management Decision Support - Level 1</b>				2011	D	E	2013											

## Development Activities Listing

### D-0880 Terminal and Surface Low Visibility ConOps

**Description:** Development of a Concept of Operations (ConOps) in low visibility conditions for terminal and surface environments. This includes development of initial procedures, guidelines, support system requirements.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airspace  
Project NASA/ARMD/ASP/NGATS ATM  
Airportal Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0880: Terminal and Surface Low Visibility ConOps</b>																		
R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions	R	D			2009													
R-0630: Applied Research on Effective Surface Management in Various Weather Conditions	R	D			2009													
R-0930: Applied Research on Low Visibility Independent Parallel and Converging Approach	R	D			2009													
R-1240: Applied Research on Low Visibility Dependent Multiple Approach Procedures	R	D			2009													
EN-0007: High-Density Arrival/Departure Detail Operational Concept		D																
EN-0023: Surface Movement - Detail Operational Concept		D																
EN-0100: Surface Movement Decision Support - Level 1 Initial		D																
EN-0026: Surface Movement Decision Support - Level 2 Mid Term																		

### D-0890 Dynamic Wake Management for Single Runway Operations

**Description:** Development of a wake vortex arrival and departure capability incorporating weather measurement and wake predictions to support dynamic wake separation procedures for single runway operations.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – System Development –  
1A13 FAA – NextGen R,E&D

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0890: Dynamic Wake Management for Single Runway Operations</b>																		
R-0600: Applied Research on Assessing and Predicting Wake Severity		R		D														
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures					2011	D												
EN-0151: Wake Vortex Configuration Advisory Decision Support - Level 2 Dynamic Drift					2012	D												
EN-0152: Wake Vortex Configuration Advisory Decision Support - Level 3 Dynamic Drift/Decay																		

### D-0920 Traffic Spacing Management Components in Terminal and Transition Airspace

**Description:** Development of traffic spacing management components to support high-throughput delivery of aircraft to the runway threshold and departure operations.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen – High Density  
Arrival/Departures – 1A16A  
NASA/ARMD/ASP/NGATS ATM Airspace  
Project NASA/ARMD/ASP/NGATS ATM  
Airportal Project

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-0920: Traffic Spacing Management Components in Terminal and Transition Airspace</b>																		
R-0370: Applied Research on Traffic Spacing Management in Terminal and Transition Airspace	R			D														
R-1120: Applied Research on Automated Flight and Flow Evaluation and Resolution Capabilities	R			D														
EN-0301: Performance-Based Separation Standards and Procedures					2010	D												
EN-0031: Avionics - Airborne Merging and Spacing					2011	D												
EN-0009: Integrated Trajectory/Separation Management - Terminal																		



## Development Activities Listing

### D-0970 Real-Time Airport Intruder Identification and Tracking System

**Description:** Development of a real-time identification and tracking system for personnel, people, and vehicles with hostile intent at an airport.

**SOPR:** DHS

**Agency Programs:** DHS – S&T Behavior Research DHS – TSA  
Airport Radar Dual Use Program

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-0970: Real-Time Airport Intruder Identification and Tracking System																		
EN-1002: Non-Cooperative Surveillance - GSE			D	E	2011													
EN-4205: BPR Technology and Procedures			D	E	2011													
EN-1005: Cooperative Surveillance - Ground Equipment			2010	D	E	2012												
EN-4204: Transportation Worker Identification Credentialing /Access Control/Tracking System			2011	D	E	2013												
EN-4201: Airport Surveillance, Tracking and Detection System - Level 1				2012	D	E	2014											
EN-4250: Airport Surveillance, Tracking and Detection System - Level 2											2018	D	E	2020				

### D-1010 NextGen Vehicle Technologies

**Description:** Complete development of NextGen vehicles technologies that reduce community noise, fuel burn, and emissions to allow integration into the commercial large and regional jet fleet.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen Environmental Research—  
Aircraft Technologies, Fuels, and Metrics,  
A13b FAA – NextGen Environment & Energy  
– Advanced Noise and Emissions Reduction,  
1A09C NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1010: NextGen Vehicle Technologies																		
R-0810: Applied Research on Noise, Emissions, and Performance Trade-offs for N+1 Aircraft			R	D	2011													
R-2126: Applied Research on Airframe Designs to Accelerate Wake Vortex Decay			R	D	2011													
EN-6007: Environmentally Improved Airframe and Engine Technology - Level 1 (N+1)			2011	D	E	2013												

### D-1020 NextGen (N+1) EMS Analysis Tools

**Description:** Development of a suite of robust environmental management control system approaches and analytical tools that provide a better understanding of the health and welfare impacts from local air quality and emissions, and translate these impacts into improved decision support to construct Environmental Management Systems (EMSs) that mitigate these effects.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen Environment and Energy -  
validation modeling, 1A09D FAA -  
Environment and Energy - A13a FAA -  
NextGen Environmental Research-Aircraft  
Technologies, Fuels, and Metrics, A13b

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1020: NextGen (N+1) EMS Analysis Tools																		
R-0200: Applied Research on Noise and Emissions Relationship Science and Models					2014	R	D	2016										
R-1330: Applied Research on Noise and Emissions Analysis Tools					2014	R	D	2016										
R-1780: Applied Research on Tools and Metrics to Model the Impacts of Emissions					2014	R	D	2016										
EN-6048: Environmental Impact Modeling and Assessment - Level 2							2016	D	E	2018								

## Development Activities Listing

### D-1070 Development of NextGen Interagency Net-Centric Security Requirements

**Description:** Development of information security plans and guidelines to support information sharing among NextGen Partners that include security policies, protocols, performance measure criteria, assessment evaluation procedures, as well as certification, verification and validation methodologies of authorized users and providers of secured and non-secured information. This is important to support agency policy decisions about sharing information.

**SOPR:** DOD

**Agency Programs:** FAA – Next Gen – SWIM

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1070: Development of NextGen Interagency Net-Centric Security Requirements</b>																		
<b>R-0940: Applied Research on the Roles and Responsibilities in a Shared Information Environment</b>	<b>R</b>	<b>D</b>																
<b>R-0950: Applied Research on Net-Centric Stakeholder Access to NextGen Information</b>	<b>R</b>	<b>D</b>																
<b>EN-1015: Enterprise Network Management Standards</b>			<b>D</b>			<b>E</b>												
<b>EN-1016: Enterprise Networks Infrastructure Services Standards</b>			<b>D</b>			<b>E</b>												
<b>EN-1043: Enterprise Networks Security Services Standards</b>			<b>D</b>			<b>E</b>												

### D-1090 Dynamic Airspace Reconfiguration

**Description:** Development of limited dynamic reconfiguration of arrival and departure airspace to support Air Traffic Management (ATM) personnel and facilities assignment to match traffic flows.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen - Collaborative ATM - 1A17A  
NASA/ARMD/ASP/NGATS ATM Airspace  
Project

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1090: Dynamic Airspace Reconfiguration</b>																		
<b>R-1050: Applied Research on Airspace Assignment Methods</b>				<b>R</b>		<b>D</b>												
<b>EN-0300: Networked Air Navigation Support Facilities</b>						<b>D</b>			<b>E</b>									

### D-1180 Aircraft Explosives Detection and Mitigation

**Description:** Development of measures to mitigate the effects of explosive devices and improvements in the tolerance of aircraft structures and systems to explosives. Additionally, development of cabin and cargo surveillance for the detection of weapons.

**SOPR:** DHS

**Agency Programs:** DHS – Aircraft Hardening – ULD

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1180: Aircraft Explosives Detection and Mitigation</b>																		
<b>EN-4602: Aircraft Threat Containment and Survivability Hardening</b>			<b>D</b>			<b>E</b>												
<b>EN-4600: Aircraft Security Systems and Policies</b>							<b>D</b>		<b>E</b>									

### D-1200 Guidance for Trajectory-Based Procedures

**Description:** Development of trajectory-based procedures to support a national policy decision on liabilities related to the shift in separation responsibility from air traffic service providers to flight operators as well as from humans to automation.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – System Development –  
1A13 FAA – NextGen R,E&D

**SO CR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1200: Guidance for Trajectory-Based Procedures</b>																		
R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions	R																	
R-0910: Applied Research on Optimizing Overlapping Runway Occupancies	R																	
R-1080: Applied Research on the Service Benefits and Costs for NextGen Aircraft Capabilities	R																	
R-1430: Applied Research on Human/Automation Roles in High-Density Surface Operations	R																	
EN-0016: Separation/Trajectory Management Detail Operational Concept	D			E														
EN-0008: Trajectory Negotiation - Level 1 Controlled Time of Arrival (CTA)					2011	D			E									
EN-0034: Trajectory Management Decision Support - Level 1					2011	D			E									
EN-0035: Separation Management Decision Support - Level 1					2011	D			E									
EN-0110: Trajectory Negotiation - Level 2 En Route Time-Based Metering					2011	D			E									
EN-0017: Trajectory Negotiation - Level 3 Automation-Assisted 4DTs									2016	D			E					
EN-0037: Trajectory Management Decision Support - Level 2									2016	D			E					
EN-0038: Separation Management Decision Support - Level 2									2016	D			E					

### D-1210 Technologies and Procedures for Dynamically Adjusting Airspace Structures

**Description:** Development of technologies and procedures for dynamically adjusting advanced airspace structures to support the execution and dissemination of information on dynamic airspace structures.

**SOPR:** FAA

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1210: Technologies and Procedures for Dynamically Adjusting Airspace Structures</b>																		
R-0540: Applied Research on Flexible Airspace Design Configurations		R		D														
R-1630: Applied Research on Flow Corridor Operational Concepts		R		D														
EN-0033: Airspace/Capacity/Flow Contingency Management Decision Support - Level 1				2011	D				E									
EN-0038: Separation Management Decision Support - Level 2									2016	D			E					
EN-0180: Airspace/Capacity/Flow Contingency Management Decision Support - Level 3 Dynamic													2020	D			E	2022

### D-1220 Development of Weather Hazard Severity Indices

**Description:** Development of severity indices for turbulence, convection, icing, and other aviation weather hazards. These indices will help identify the impacts of weather on specific aircraft types and configurations that will be crucial during collaborative decision-making.

**SOPR:** FAA

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1220: Development of Weather Hazard Severity Indices</b>																		
R-1230: Applied Research on Weather and Wake Impacts for En Route Operations		R		D														
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1			D			E												
EN-0301: Performance-Based Separation Standards and Procedures			2010	D			E											
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2								2015	D			E						
EN-2682: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3											2019	D			E			2021

### D-1250 Safe Taxi Operations in Low Visibility Conditions

**Description:** Development of safe taxi operations in low visibility conditions to support an implementation decision on surface operations in near all-weather conditions.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project NASA/ARMD/ASP/Integrated  
Intelligent Flight Deck

**SO CR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1250: Safe Taxi Operations in Low Visibility Conditions																		
R-0610: Applied Research on Safe Taxi Operations in Low Visibility Conditions																		
EN-1007: Avionics - Trajectory Management - Advanced Surface Operations																		

### D-1320 Missile Defense Systems for Commercial Aircraft

**Description:** Development of counter measures to provide protection against Man-Portable Air Defense Systems (MANPADS).

**SOPR:** DHS

**Agency Programs:** CHS – Counter MANPADS

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1320: Missile Defense Systems for Commercial Aircraft																		
EN-4610: Aircraft External Threat Defense/Mitigation Systems																		

### D-1360 Virtual Tower Capability

**Description:** Development of the virtual tower capability as an alternative for expanding air traffic service to additional airports while enhancing the Air Navigation Service Provider's (ANSP's) productivity.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/Airspace System Program

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1360: Virtual Tower Capability																		
R-1040: Applied Research on the Virtual Tower Capability																		
EN-0019: Virtual Tower - Detail Operational Concept																		

### D-1420 Business Continuity Requirements for Networked Facilities

**Description:** Development of business continuity requirements to support an implementation decision on how to transition to networked facilities.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen – Network Facilities – 1A120A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1420: Business Continuity Requirements for Networked Facilities																		
EN-0300: Networked Air Navigation Support Facilities																		

### D-1530 Spatial Weather Prediction Models for the 4D Weather Cube

**Description:** Development of nested spatial scale numerical weather prediction models to support the nested spatial forecast information requirements for the Four Dimensional (4D) weather cube.

**SOPR:** DOC

**Agency Programs:** FAA - NextGen - Reduce Weather Impact - 1A15A

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1530: Spatial Weather Prediction Models for the 4D Weather Cube																		
R-0100: Applied Research on Accuracy and Resolution Requirements for NextGen Weather																		
EN-2500: Improve Weather Models - Level 1																		

## Development Activities Listing

### D-1550 Augmentation Strategy for GNSS

**Description:** Development of the augmentation strategy for Global Navigation Satellite Systems (GNSS). The National Positioning, Navigation, and Timing (PNT) Architecture has highlighted opportunities to transition or divest US GNSS augmentation assets that are unnecessarily redundant and integrate, or at least coordinate, use of the Federally-owned/leased ground-based reference stations and processing facilities. It will remain essential to monitor Global Positioning System (GPS) and GNSS signals, to detect signal anomalies and interference, and provide real-time integrity and performance monitoring of the service. Supporting agencies shall develop a coordinated evaluation which determines the need for a GNSS augmentation enhancement.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1550: Augmentation Strategy for GNSS																		
EN-1101: Enhanced NextGen PNT Services															2023	D	E	

### D-1560 Flight Risk Assessment Algorithms

**Description:** Complete the development of trajectory-based flight risk assessment algorithms, a component of the overall NextGen flight risk assessment, to support an implementation decision on dynamic flight risk assessment.

**SOPR:** FAA

**Agency Programs:** FAA – Security Integration Tool Set (SITS)

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1560: Flight Risk Assessment Algorithms																		
R-1170: Applied Research on Flight Risk Assessment Algorithms			R	D	2010													
EN-4500: Flight Risk Management System - Level 1 Static			2010	D	E	2012												
EN-4521: Flight Risk Management System - Level 2 Dynamic						2014	D	E	2016									

### D-1640 Wind-Dependent Wake Vortex Arrival Procedures and Tools

**Description:** Development of wind-dependent wake vortex arrival procedures and associated controller decision support tools that will assist the Federal Aviation Administration (FAA) investment decision on a ground-based capability to reduce wake separation for those following a heavy aircraft on closely spaced parallel runways.

**SOPR:** FAA

**Agency Programs:** FAA - Wake Turbulence, A12.b FAA - NextGen - System Development - 1A13

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1640: Wind-Dependent Wake Vortex Arrival Procedures and Tools																		
EN-0150: Wake Vortex Configuration Advisory Decision Support - Level 1 Static Drift Only			2010	D	E	2012												
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures				2011	D	E	2013											
EN-0151: Wake Vortex Configuration Advisory Decision Support - Level 2 Dynamic Drift				2012	D	E	2014											
EN-0030: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 2 Wake Drift/Decay						2014	D	E	2016									
EN-0152: Wake Vortex Configuration Advisory Decision Support - Level 3 Dynamic Drift/Decay						2014	D	E	2016									

### D-1680 Advanced Wake Sensing Capabilities

**Description:** Development of advanced wake sensing capabilities to support dynamic wake spacing.

**SOPR:** FAA

**Agency Programs:** FAA – NextGen R,E&D FAA – NextGen – System Development – 1A13

**SOGR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1680: Advanced Wake Sensing Capabilities</b>																		
R-0600: Applied Research on Assessing and Predicting Wake Severity																		
R-1230: Applied Research on Weather and Wake Impacts for En Route Operations																		
EN-0212: Parameter Driven Aircraft Separation Standards and Procedures																		
EN-0029: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 1 Wake Drift																		
EN-0030: Wake Detection/Prediction w/Dynamic Wake Spacing - Level 2 Wake Drift/Decay																		

### D-1700 System Risk Assessment and Management Models

**Description:** Development of system risk assessment and management models that provide safety risk information on the allocation of responsibilities between flight operators and Air Navigation Service Providers (ANSP) automation.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1700: System Risk Assessment and Management Models</b>																		
R-2122: Applied Research on System Risk Assessment and Management Models																		
EN-3025: Automated Prognostic Risk Identification																		

### D-1710 Risk Reducing Interfaces, Procedures, and Training

**Description:** Development of risk-reducing interfaces, procedures, and training that reduce human error and complement the development of automation for NextGen.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1710: Risk Reducing Interfaces, Procedures, and Training</b>																		
R-1260: Applied Research on Risk-reducing Systems Interfaces, Procedures, and Training																		
R-2121: Applied Research of Human Performance Models																		
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training																		
R-2138: Applied Research on Human Error Using Automated Systems																		
EN-3108: Enhanced Focus on Safe Operational Procedures																		
EN-3109: Advanced Training Concepts for Safe System Operation																		
EN-1040: Space Based Navigation System - Galileo																		
EN-3060: Improved Operational Decision Aids - Airborne Level 1																		
EN-3068: Improve Operational Decision Aids - Ground Level 1																		
EN-3110: Ensure the Availability and Accessibility of Required Information																		
EN-3111: Increase the Usefulness and Understandability of Information																		
EN-3112: Maintain Appropriate Human Engagement																		
EN-3122: Reduced Controlled Flight into Terrain - Level 1																		
EN-3061: Improved Operational Decision Aids - Airborne Level 2																		
EN-3069: Improve Operational Decision Aids - Ground Level 2																		
EN-3123: Airborne Weather Information Technologies- Level 1																		
EN-3124: Reduced Controlled Flight into Terrain - Level 2																		
EN-3125: Airborne Weather Information Technologies- Level 2																		

## Development Activities Listing

### D-1730 Aircraft Procedures and Control Technologies to Reduce Environmental Impacts

**Description:** Development of aircraft operational control technologies and procedures to enable maximum use by the commercial fleet of air terminal and air space operational procedures that reduce noise, air quality, and greenhouse gas emissions.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environment & Energy – Advanced Noise and Emissions Reduction, 1A09C NASA/ARMD/ASP NASA/ARMD/Fundamental Aeronautics/Subsonic Rotary Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1730: Aircraft Procedures and Control Technologies to Reduce Environmental Impacts</b>																		
R-0050: Applied Research on Sustainable Environmental Ramp Operations				2011	R		D	2013										
R-1340: Applied Research on Aviation Procedures to Reduce Environmental Impacts				2011	R		D	2013										
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools					2013	D		E	2015									
EN-6005: Environmentally Improved En Route Air Navigation -Level 1 Route Planning/Selection					2013	D		E	2015									
EN-6046: Environmentally Improved Surface Operations - Level 2 - Enhanced					2013	D		E	2015									
EN-6030: Environmentally Improved En Route Air Navigation -Level 2 Dynamic Routing							2016	D		E	2018							
EN-6042: Environmentally Improved Terminal Area Navigation - Level 2 Automation/Mechanisms							2016	D		E	2018							
EN-6043: Environmentally Improved Terminal Area Navigation - Level 3 Dynamic Information										2018	D		E	2020				

### D-1740 Environmental Impact Management Capability

**Description:** Development of a capability to dynamically manage environmental impacts while addressing the needs of the National Airspace System (NAS) (including metrics, performance goals, and operational controls for automated systems).

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environment & Energy – Advanced Noise and Emissions Reduction, 1A09C FAA – NextGen Environment and Energy – validation modeling, 1A09D FAA – NextGen Environmental Research—Aircraft Technologies, Fuels, and Metrics, A13b

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1740: Environmental Impact Management Capability</b>																		
R-1750: Applied Research on the Policy and Procedures to Reduce Aviation Environmental Impact				2011	R		D	2013										
EN-6004: Environmentally Improved Terminal Area Navigation - Level 1 Tools					2013	D		E	2015									
EN-6005: Environmentally Improved En Route Air Navigation -Level 1 Route Planning/Selection					2013	D		E	2015									
EN-6046: Environmentally Improved Surface Operations - Level 2 - Enhanced					2013	D		E	2015									

### D-1820 Foreign GNSS Usage Strategy

**Description:** Development of the strategy for using foreign Global Navigation Satellite Systems (GNSS). These systems offer significant and expanding services; the United States (US) must work through standards organizations to identify clear standards and criteria for use of foreign Positioning, Navigation, and Timing (PNT) systems for safety-of-life applications and critical infrastructure users. The modernization capabilities and timeline for Global Positioning System (GPS) and other GNSS systems need to be understood and coordinated so that standards for interoperable signals and user equipment are developed with sufficient lead time to facilitate a timely and cost effective transition from legacy GPS to the NextGen PNT architecture.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-1820: Foreign GNSS Usage Strategy</b>																		
EN-1040: Space Based Navigation System - Galileo					2013	D		E	2015									
EN-1044: Space Based Navigation System - International GNSS							2016	D		E	2018							



## Development Activities Listing

### D-1830 National PNT Architecture Strategy

**Description:** Development of a national Positioning, Navigation, and Timing (PNT) architecture strategy by contributing agencies and the National Space Based PNT Coordination Office (NCO). They will establish joint programs to provide the necessary infrastructure to meet NextGen PNT requirements. The National PNT architecture will identify the mix of systems/subsystems needed from an Enterprise Architecture (EA) standpoint, so that program plans and budgets can be established. Legacy and modernized Global Positioning Systems (GPS) will establish the baseline level of performance from which the need for further augmentation shall be evaluated. The National PNT architecture plan will include the evolution of Global Navigation Satellite System (GNSS)-based services and identify appropriate agencies to implement the plan within a specified timeline. In addition, interagency responsibilities, commitments, and agreement need to be established to fund and implement the recommended solutions, including those associated with cost sharing.

**SOPR:** National Coordination Office (NCO)

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-1830: National PNT Architecture Strategy																		
EN-1101: Enhanced NextGen PNT Services															2023	D	E	

### D-2100 Complex System Validation and Verification Tools and Techniques

**Description:** Development of complex system validation and verification tools and techniques. Complex systems provide multiple functions that support many different operating models, environments, and technologies; and therefore require more advanced integrated validation, verification tools and techniques beyond those used for less complex systems. This research will support the development of complex systems, their risk assessments and eventually certification decisions.

**SOPR:** FAA

**Agency Programs:** NASA/ARMD/Airspace Systems Program  
NASA/ARMD/AvSafe

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2100: Complex System Validation and Verification Tools and Techniques																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards			R	D	2010													
R-1440: Applied Research on Complex Systems Validation and Verification			R	D	2010													
EN-3050: Advanced Complex System Validation and Verification Methods			2010	D	E	2012												

### D-2110 Environmental Metrics of New and Alternative Vehicle Classes

**Description:** Development of environmental metrics for new and alternative vehicle classes, including Unmanned Aerial Vehicles (UAVs), very light jets, rotorcraft, and supersonic business jets.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen Environmental  
Research-Aircraft Technologies, Fuels, and  
Metrics, A13b NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing  
NASA/ARMD/Fundamental  
Aeronautics/Supersonic  
NASA/ARMD/Fundamental  
Aeronautics/Subsonic Rotary Wing

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2110: Environmental Metrics of New and Alternative Vehicle Classes																		
R-1030: Applied Research on Environmental Metrics for New and Alternative Vehicle Classes			2011	R	D	2013												
EN-6035: Environmentally Improved Aircraft Airframe and Engines - Level 1				2013	D	E	2015											
EN-6037: Environmentally Improved Aircraft Airframe and Engines - Level 2											2019	D	E	2021				

### D-2111 Threat Detection and Screening Technologies

**Description:** Development of threat detection (i.e., Chemical, Biological, Radiological, Nuclear, and High-Yield Behavior (CBRNE), weapons, behavior recognition, intruder facility access, and perimeter breach) and screening technology for use in aviation facilities.

**SOPR:** DHS

**Agency Programs:**

**SOCR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2111: Threat Detection and Screening Technologies</b>																		
R-0980: Applied Research on Sensor Threat Detection and Screening Technology	R	D																
R-1160: Applied Research on Cargo/Mail Threat Detection and Screening Technologies	R	D																
R-1300: Applied Research on Modular Components used in Threat Detection and Screening	R	D																
R-1310: Applied Research on a Checked Baggage Threat Detection and Screening System	R	D																
EN-4107: Checkpoint Screening Technology - Enhance Passenger Screening Throughput		D		E														
EN-4205: BPR Technology and Procedures		D		E														
EN-4204: Transportation Worker Identification Credentialing /Access Control/Tracking System					2011	D		E										
EN-4201: Airport Surveillance, Tracking and Detection System - Level 1					2012	D		E										
EN-4301: Baggage/Cargo Screening Technology - CBRNE and Weapons					2012	D		E										
EN-4208: Airport CBRNE Detection Systems					2013	D		E										
EN-4302: Baggage/Cargo Screening Technology - Increased Effectiveness					2013	D		E										
EN-4106: Checkpoint Screening Technology - CBRNE and Weapons					2014	D		E										
EN-4307: Baggage/Cargo Screening Technology - Integrated Screening System					2014	D		E										
EN-4108: Checkpoint Screening Technology - Integrated Screening System					2015	D		E										
EN-4250: Airport Surveillance, Tracking and Detection System - Level 2										2018	D		E		2020			

### D-2113 Operating Procedures for Human Forecasters using Automated Systems

**Description:** Development of operating procedures outlining the role of human forecasters augmenting automatically generated Four-Dimensional (4D) weather grids.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/Aviation Safety  
Program/Integrated Vehicle Health  
Management

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2113: Operating Procedures for Human Forecasters using Automated Systems</b>																		
R-1520: Applied Research on the Role of Human Forecasters and Automated Systems	R	D																
EN-2680: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 1			D		E													
EN-2681: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 2							2015	D		E								
EN-2682: Methodologies and Algorithms for Weather Assimilation into Decision-Making - Level 3											2019	D		E		2021		

### D-2115 Initial Probabilistic Weather Forecasts

**Description:** Development of the first generation of probabilistic weather forecasts (e.g., convective and winter storms, icing, turbulence, ceiling, and visibility), which will include resolution and accuracy requirements for the weather forecasting information, as well as, methods for communicating their uncertainty.

**SOPR:** FAA

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2115: Initial Probabilistic Weather Forecasts</b>																		
R-0580: Applied Research for Initial Probabilistic Weather Forecasts		R		D														
EN-2500: Improve Weather Models - Level 1			2011	D		E												
EN-2501: Improve Weather Models - Level 2							2015	D		E								

## Development Activities Listing

### D-2117 Network-Enabled Weather Data Standards

**Description:** Development of a virtual, authoritative, net-centric Four Dimensional (4D) weather information system that provides information tailored to Air Traffic Management (ATM) procedures, including routine (diagnostics and forecasts) and real-time hazardous weather information to support an implementation decision on the network-enabled 4D Weather Cube.

**SOPR:** DOC

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2117: Network-Enabled Weather Data Standards																		
R-0110: Applied Research on the Integration of Forecast and Observational Data																		
R-0860: Applied Research on Hazard Information Exchange using Aircraft Sensor Technology																		
EN-2050: Information Sharing Standards: Weather Information																		

### D-2119 Passenger Information System for Intermodal Travel Planning

**Description:** Development of a passenger information system that will provide consolidated information on ground transportation modes regarding airports, prices, schedules, and routes.

**SOPR:** Industry

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2119: Passenger Information System for Intermodal Travel Planning																		
R-0090: Applied Research on Industry Standards for Intermodal Travel Planning																		
EN-5029: Intermodal Ground Transportation Information System																		

### D-2121 NextGen ALS

**Description:** Development of NextGen Approach Lighting Systems (ALS) including requirements for physical and electrical interface, power supplies, and control system. Development will also include updating system standards from legacy ALS, and addressing issues such as integration with other available technologies, and human factors.

**SOPR:** FAA

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2121: NextGen ALS																		
R-2118: Applied Research on NextGen Lighting Systems																		
EN-1066: Ground Based Navigation System (GBNS) - NextGen Lighting Systems																		

### D-2123 Aircraft Systems Weather Mitigation Requirements

**Description:** Development of airframe and aircraft systems weather mitigation requirements. The goal of these requirements is to reduce the impact of weather under various routine and hazardous conditions.

**SOPR:** Industry

**Agency Programs:**

**SO CR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2123: Aircraft Systems Weather Mitigation Requirements																		
R-1150: Applied Research on Airframe and Aircraft System Weather Mitigation Technique Benefits																		
EN-2870: Aircraft Systems - Weather Mitigation Requirements																		

## Development Activities Listing

### D-2125 Situational Awareness Technologies in Low-Visibility and Surface Operations

**Description:** Development of situational awareness technology for use in low visibility and surface operations.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS ATM Airportal  
Project FAA—FAA – NextGen – System  
Development – 1A13 FAA – NextGen R,E&D

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2125: Situational Awareness Technologies in Low-Visibility and Surface Operations																		
R-0120: Applied Research on Low-Visibility and Surface Operation Technologies		R	D	2009														
R-0130: Applied Research on Automation-Assisted Collaboration Capabilities		R	D	2009														
EN-0102: Avionics - Moving Map Display			D		E	2011												
EN-1007: Avionics - Trajectory Management - Advanced Surface Operations			2010	D		E	2012											
EN-0101: Avionics - Enhanced Obstacle Detection							2015	D		E	2017							

### D-2127 3D RNAV/RNP Procedures

**Description:** Development of initial Three Dimensional (3D) Area Navigation/Required Navigation Performance (RNAV/RNP) procedures for aircraft operator implementation.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA - NextGen - Flexible Terminals and  
Airports - 1A18A

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2127: 3D RNAV/RNP Procedures																		
R-0340: Applied Research on 3D RNAV/RNP Procedures		R		D	2010													
R-0590: Applied Research on Optimizing Visual Flight Rule (VFR) Operations		R		D	2010													
R-0670: Applied Research on Applying "Control by Points" TMI		R		D	2010													
EN-0301: Performance-Based Separation Standards and Procedures			2010	D		E	2012											

### D-2129 Required Aircraft 4DT Intent Data

**Description:** Development of the requirements for Four Dimensional Trajectory (4DT) intent data outputs and associated precision to support fixed and variable separation management and associated procedures in performance-based airspace.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/ASP/NGATS - ATM Airspace  
Project FAA - NextGen-System Development-  
1A13FAA - NextGen R,E&D

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2129: Required Aircraft 4DT Intent Data																		
R-0140: Applied Research on 4DT Use in Clearances and Flight Plans					2013	R		D	2015									
R-0820: Applied Research for Required Aircraft 4DT Intent Data					2013	R		D	2015									
EN-1063: Mobile Data Communications Management Applications - Level 2							2015	D		E	2017							
EN-1207: Air - Ground Data Exchange – Clearance and Instruction Services – Tower Group 2							2015	D		E	2017							
EN-1213: Air - Ground Data Exchange – Clearance and Instructions Services – TRACON Group 2							2015	D		E	2017							
EN-1210: Air - Ground Data Exchange - Clearance and Instructions Services - En Route Group 2								2016	D		E	2018						
EN-1064: Mobile Data Communications Management Applications - Level 3												2020	D		E	2022		

### D-2131 Required Oceanic Flight Profile Information

**Description:** Develop requirements for determining optimal flight profile information to support alternatives selection for altitude changes and co-altitude pair-wise maneuvers at reduced separation in oceanic airspace.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** FAA – NextGen-Trajectory-Based Operations-  
1A14A

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2131: Required Oceanic Flight Profile Information																		
R-1590: Applied Research for Required Oceanic Flight Profile Information																		
EN-0160: Oceanic Web Enabled Collaborative Trajectory Planning																		
EN-0161: Oceanic Trajectory - 4DT En Route																		

### D-2133 Air and Ground-based Runway Incursion Detection Technology

**Description:** Development of complementary air- and ground-based runway incursion prevention and detection systems.

**SOPR:** NASA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2133: Air and Ground-based Runway Incursion Detection Technology																		
R-0350: Applied Research on Air and Ground-Based Runway Incursion Detection Technologies																		
EN-5004: Airport GSE Surface Management System																		
EN-0109: Avionics - Surface Conflict Management																		
EN-0101: Avionics - Enhanced Obstacle Detection																		

### D-2135 Air and Ground Separation Management Architecture

**Description:** Development of air/ground separation management architectures that can satisfy NextGen's increased capacity and safety requirements.

**SOPR:** NASA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2135: Air and Ground Separation Management Architecture																		
R-0510: Applied Research on Air and Ground Separation Management Architectures																		
R-0530: Applied Research on Automated Air and Ground Separation Management Alternatives																		
EN-0034: Trajectory Management Decision Support - Level 1																		
EN-0035: Separation Management Decision Support - Level 1																		
EN-0037: Trajectory Management Decision Support - Level 2																		
EN-0038: Separation Management Decision Support - Level 2																		
EN-0009: Integrated Trajectory/Separation Management - Terminal																		

### D-2137 Performance Requirements for Aircraft-Based CNS Technologies in Self Separation Airspace

**Description:** Development of aircraft technologies and procedures for airborne separation capabilities in self separation airspace.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2137: Performance Requirements for Aircraft-Based CNS Technologies in Self Separation																		
R-1600: Applied Research on Aircraft-Based CNS Technologies in Self-Separation Airspace																		
EN-0032: Avionics - Airborne Self-Separation																		

## Development Activities Listing

### D-2139 ULS Conventional Jet Fuels

**Description:** Development of Ultra-Low Sulfur (ULS) fuels to reduce impacts on air quality.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – NextGen Environmental Research—  
Aircraft Technologies, Fuels, and Metrics,  
A13b FAA – NextGen Environment & Energy  
– Advanced Noise and Emissions Reduction,  
1A09C NASA/ARMD/Fundamental  
Aeronautics/Subsonic Fixed Wing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2139: ULS Conventional Jet Fuels																		
R-2124: Applied Research on Ultra-Low Sulfur Conventional Jet Fuels																		
EN-6049: Available Alternative Fuels - Level 2																		

### D-2141 Methodologies and Metrics to Assess Aviation's Impact on Climate Change

**Description:** Complete development of metrics to assess aviation's impact on climate change.

**SOPR:** FAA

**SOCR:**

**Agency Programs:** FAA – Environment and Energy - A13a FAA –  
NextGen Environmental Research—Aircraft  
Technologies, Fuels, and Metrics, A13b

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2141: Methodologies and Metrics to Assess Aviation's Impact on Climate Change																		
EN-6033: Science and Metrics of Local Emissions - Level 2 Advanced																		
EN-6039: Enhanced Global Climate Metrics																		
EN-6053: Science of Global Climate - Level 2 Advanced																		

### D-2143 National Surveillance Architecture

**Description:** Development of a national surveillance architecture to meet the operational needs for NextGen, which includes Air Traffic Management (ATM), defense, and security.

**SOPR:** DOD

**SOCR:**

**Agency Programs:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2143: National Surveillance Architecture																		
R-0270: Applied Research on a National Surveillance and Communications Needs Assessment																		
R-0790: Applied Research for a National Surveillance Architecture																		
EN-1049: Integrated Surveillance Information Service Level 1																		
EN-1510: Integrated Surveillance Information Service Level 2																		
EN-1511: Integrated Surveillance Information Service Level 3																		

### D-2145 Vulnerability Detection Tools

**Description:** Development of vulnerability detection tools that will monitor and analyze safety information environments and data resources.

**SOPR:** NASA

**SOCR:**

**Agency Programs:** NASA/ARMD/Aviation Safety  
Program/Integrated Vehicle Health  
Management FAA - NextGen - System Safety  
Management Transformation - 1A09G

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2145: Vulnerability Detection Tools																		
R-0020: Applied Research on Vulnerability Discovery	R	D																
EN-3023: Automated System Vulnerability Detection		D		E														
EN-3103: Safety Assurance Processes and Tools									2016	D		E		2018				

### D-2147 Airborne Collision Avoidance Back-up System

**Description:** Development of a safety backup for an airborne collision avoidance system.

**SOPR:** FAA

**Agency Programs:** FAA - NextGen High-Density  
Arrival/Departures

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2147: Airborne Collision Avoidance Back-up System																		
R-1580: Applied Research on an Airborne Collision Avoidance System	R																	
EN-0203: Avionics - Traffic Collision and Avoidance System - Level 1		E																
EN-0204: Avionics - Traffic Collision and Avoidance System - Level 2			D		E													
EN-3062: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 1						2013	D		E		2015							
EN-3063: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 2															2023	D		E

### D-2149 Contributing Factor Analysis Tools

**Description:** Development of contributing factor analysis tools that will monitor and analyze safety information.

**SOPR:** NASA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2149: Contributing Factor Analysis Tools																		
R-2132: Applied Research on Contributing Factor Analysis	R																	
EN-3024: Advanced Incident Contributing Factor Analysis		D		E														

### D-2151 Prognostic Risk Management Tools

**Description:** Development of prognostic risk management tools that will monitor and analyze safety information.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2151: Prognostic Risk Management Tools																		
R-2134: Applied Research on Prognostic Risk Management	R																	
EN-3025: Automated Prognostic Risk Identification		D		E														

### D-2153 Fault Management Tools

**Description:** Development of fault management tools that will monitor and analyze safety information.

**SOPR:** NASA

**Agency Programs:**

**SOGR:**



## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2153: Fault Management Tools																		
R-2136: Applied Research on Fault Management				R	2008													
EN-3027: Improved Fault Management				D	E	2010												

### D-2155 Availability and Accessibility of Required Information Design Guidelines

**Description:** Development of design guidelines for various system interfaces that reduce manipulation required to access needed information. Interfaces will address shortcomings where the information is available, but the number of steps required to obtain the information is problematic. These guidelines will be developed for airborne and ground-based systems. The research and development supporting the development of these guidelines will also identify the interfaces for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2155: Availability and Accessibility of Required Information Design Guidelines																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards				2011	R	D	2013											
R-2121: Applied Research of Human Performance Models				2011	R	D	2013											
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training				2011	R	D	2013											
R-2138: Applied Research on Human Error Using Automated Systems				2011	R	D	2013											
EN-3110: Ensure the Availability and Accessibility of Required Information					2013	D	E	2015										

### D-2157 Usefulness and Understandability of Information Design Guidelines

**Description:** Development of design guidelines for various system interfaces that target the reduction of human error due to confusion concerning information presented. These guidelines will be developed for airborne and ground-based systems. The research and development supporting the development of these guidelines will also identify the interfaces for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2157: Usefulness and Understandability of Information Design Guidelines																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards				2011	R	D	2013											
R-2121: Applied Research of Human Performance Models				2011	R	D	2013											
R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training				2011	R	D	2013											
R-2138: Applied Research on Human Error Using Automated Systems				2011	R	D	2013											
EN-3111: Increase the Usefulness and Understandability of Information					2013	D	E	2015										

### D-2159 Appropriate Human Engagement Design Guidelines

**Description:** Development of design guidelines for various system interfaces that target the reduction of human error due to automation mode confusion and user complacency due to over reliance on automation. Interfaces based on these guidelines will reduce the risk of the human not understanding what the automation is doing and how it is performing and address the issue of the appropriate roles of the human and automation in a systems context. These guidelines will be developed for airborne and ground-based systems. The research and development supporting the development of these guidelines will also identify the interfaces for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2159: Appropriate Human Engagement Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>			2011	R		D		2013										
<b>R-2121: Applied Research of Human Performance Models</b>			2011	R		D		2013										
<b>R-2130: Applied Research on Risk-Reducing Systems Interfaces, Procedures, and Training</b>			2011	R		D		2013										
<b>R-2138: Applied Research on Human Error Using Automated Systems</b>			2011	R		D		2013										
<b>EN-3112: Maintain Appropriate Human Engagement</b>					2013	D		E	2015									

### D-2161 Operational Decision Aids Design Guidelines

**Description:** Development of design guidelines for technologies that reduce time required to optimize decisions, reduce the number of hazards encountered, and mitigate consequences of hazard encounter. These airborne technologies will improve the awareness and mitigate response to airborne events and hazards. These technologies will reduce the time required to optimize decisions and reduce the number of hazards actually encountered. The research and development supporting the development of these guidelines will also identify the system for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2161: Operational Decision Aids Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>			2011	R		D		2013										
<b>R-2121: Applied Research of Human Performance Models</b>			2011	R		D		2013										
<b>R-2138: Applied Research on Human Error Using Automated Systems</b>			2011	R		D		2013										
<b>EN-3060: Improved Operational Decision Aids - Airborne Level 1</b>					2013	D		E	2015									
<b>EN-3068: Improve Operational Decision Aids - Ground Level 1</b>					2013	D		E	2015									
<b>EN-3061: Improved Operational Decision Aids - Airborne Level 2</b>															2023	D		E
<b>EN-3069: Improve Operational Decision Aids - Ground Level 2</b>															2023	D		E

### D-2163 Reliability and Airworthiness of Aircraft Design Guidelines

**Description:** Development of design guidelines for various technologies that reduce system-level failures and reduce diversions or non-complete missions. Technologies based on these guidelines will bring greater reliability to aircraft systems, including controls, avionics, and data and information management, as well as, the long-term structural airworthiness of new materials and advanced aircraft designs. The research and development supporting the development of these guidelines will also identify the systems for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2163: Reliability and Airworthiness of Aircraft Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>			2011	R		D		2013										
<b>R-1270: Applied Research on Advanced Materials and Design for New Aircraft</b>			2011	R		D		2013										
<b>EN-3054: Improved Reliability and Airworthiness of Aircraft - Level 1</b>					2013	D		E	2015									
<b>EN-3055: Improved Reliability and Airworthiness of Aircraft - Level 2</b>															2023	D		E

### D-2165 Vehicle Systems Health Management Design Guidelines

**Description:** Development of design guidelines for various technologies that reduce systems failures or reduce the impact of failure that occur. These health monitoring and mitigation technologies will monitor systems and integrate information from various sensors to not only identify and mitigate sub-system failures, but send information to dispatch and maintenance so that trends may be assessed to avert potential failures. The research and development support the development of these guidelines will also identify the systems for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2165: Vehicle Systems Health Management Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>				2011	R		D		2013									
<b>R-1280: Applied Research on System Health Management</b>				2011	R		D		2013									
<b>EN-3056: Improved Vehicle Systems Health Management - Level 1</b>					2013	D		E	2015									
<b>EN-3057: Improved Vehicle Systems Health Management - Level 2</b>															2023	D		E

### D-2167 Reliability and Accuracy of Data and Information Design Guidelines

**Description:** Development of design guidelines for technologies that increases the reliability and accuracy of the data received by the aircraft and reduces the amount of processing required to understand said data and information. The research and development supporting the development of these guidelines will also identify the systems for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2167: Reliability and Accuracy of Data and Information Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>				2011	R		D		2013									
<b>EN-3058: Increased Reliability and Accuracy of Data and Information - Level 1</b>					2013	D		E	2015									
<b>EN-3059: Increased Reliability and Accuracy of Data and Information - Level 2</b>															2023	D		E

### D-2169 Aircraft Conformance to Operations Requirements Design Guidelines

**Description:** Development of design guidelines for airborne technologies that reduce deviations from new operating procedures. Technologies resulting from these guidelines will address the need to improve the conformance of the aircraft to more stringent operations requirements, with a performance measure of reduced deviations from these new operating requirements. The development of these guidelines will also identify the systems for this continuous safety improvement.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2169: Aircraft Conformance to Operations Requirements Design Guidelines</b>																		
<b>R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards</b>				2011	R		D		2013									
<b>EN-3062: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 1</b>					2013	D		E	2015									
<b>EN-3063: Ensure Aircraft Conformance to More Stringent Operations Requirements - Level 2</b>															2023	D		E

### D-2171 Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines

**Description:** Development of design guidelines for technologies that reduce injuries and fatalities due to post crash fires, toxic fumes, and/or impact loads. The technologies following these guidelines will apply to airborne systems. The research and development supporting the development of these guidelines will also identify the systems for this continuous safety improvement enabler.

**SOPR:** Industry

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2171: Aircraft System Contributions to Survival in Crash Scenarios Design Guidelines</b>																		
<b>EN-3064: Increase Aircraft System Contributions to Survival in Crash Scenarios - Level 1</b>					2013	D		E	2015									
<b>EN-3130: Increased Crash Survivability - Aircraft Structures &amp; Components</b>					2013	D		E	2015									
<b>EN-3131: Increased Crash Survivability- Aircraft Fire Prevention &amp; Suppression</b>					2013	D		E	2015									
<b>EN-3065: Increase Aircraft System Contributions to Survival in Crash Scenarios- Level 2</b>															2023	D		E

## Development Activities Listing

### D-2173 Ground-Based Systems Health Management Design Guidelines

**Description:** Development of design guidelines for technologies that reduce system failures or impact of failures that occur. Technologies resulting from these guidelines are centered on ground-based system health monitoring. Technologies will include advanced automation to manage information flow, aid in decision-making, and perform monitoring functions that will reduce systems failures or reduce the impact of failures that occur. The development of these guidelines will also identify the systems for this continuous safety improvement.

**SOPR:** Industry

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2173: Ground-Based Systems Health Management Design Guidelines																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards				2011	R		D	2013										
R-1280: Applied Research on System Health Management				2011	R		D	2013										
EN-3066: Improved Ground-Based Systems Health Management - Level 1					2013	D		E	2015									
EN-3067: Improved Ground-Based Systems Health Management - Level 2																2023	D	E

### D-2175 Ground-Based System Conformance Design Guidelines

**Description:** Development of design guidelines for ground-based technologies that reduce deviations from new operating procedures. Technologies resulting from these guidelines will address the need to improve the conformance to more stringent operations requirements, with a performance measure of reduced deviations from these new operating requirements. The development of these guidelines will also identify the systems for this continuous safety improvement.

**SOPR:** Industry

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2175: Ground-Based System Conformance Design Guidelines																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards				2011	R		D	2013										
EN-3070: Ensure Ground-based System Conformance to Operations Requirements - Level 1					2013	D		E	2015									
EN-3071: Ensure Ground-based System Conformance to Operations Requirements - Level 2																2023	D	E

### D-2177 Ground-Based System Contribution to Survival in Crash Scenarios Design Guidelines

**Description:** Development of design guidelines for technologies that reduce emergency response time and reduce fatalities due to crash conditions. Technologies based on these guidelines will include advanced systems for restraining aircraft from an overrun or other abnormal landing situations and recognizing and responding quickly to the crash scene. The development of these guidelines will also identify the systems for this continuous safety improvement.

**SOPR:** Industry

**Agency Programs:**

**SOGR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D-2177: Ground-Based System Contribution to Survival in Crash Scenarios Design Guidelines																		
R-0800: Applied Research on Certification Methods, Requirements, and Equipment Standards				2011	R		D	2013										
EN-3072: Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 1					2013	D		E	2015									
EN-3073: Increase Ground-based System Contribution to Survival in Crash Scenarios - Level 2																2023	D	E

### D-2179 Enhanced Ground-Based Weather Sensors

**Description:** Development of NextGen ground-based sensors that will be installed/modified at specified airports and other locations to provide weather and environmental observations.

**SOPR:** FAA

**Agency Programs:**

**SOGR:**

## Development Activities Listing

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2179: Enhanced Ground-Based Weather Sensors</b>																		
EN-1003: Non-Cooperative Surveillance Information Service	2010		D		E													
EN-2220: Network-Enabled Weather Observation System - Ground-Based Level 1	2010		D		E													
EN-2221: Network-Enabled Weather Observation System - Ground-Based Level 2					2014		D		E		2016							
EN-2222: Network-Enabled Weather Observation System - Ground-Based Level 3										2018	D		E		2020			

### D-2191 Enhanced Airborne-Based Weather Sensors

**Description:** Development of NextGen airborne sensors that is installed/modified on aircraft and unmanned aerial systems to provide weather and environmental observations.

**SOPR:** FAA

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2191: Enhanced Airborne-Based Weather Sensors</b>																		
R-0860: Applied Research on Hazard Information Exchange using Aircraft Sensor Technology	R		D		2010													
EN-2230: Network-Enabled Weather Observation System - Airborne Level 1 - Major Carriers	2010		D		E		2012											
EN-2231: Network-Enabled Weather Observation System - Airborne Level 2 - High-End Aircraft					2014		D		E		2016							
EN-2232: Network-Enabled Weather Observation System - Airborne Level 3 - UAS										2018	D		E		2020			

### D-2193 Enhanced Space-Based Weather Sensors

**Description:** Development of NextGen satellite sensors that are incorporated into new satellite systems to provide weather and environmental observations.

**SOPR:** DOC

**Agency Programs:**

**SOCR:**

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>D-2193: Enhanced Space-Based Weather Sensors</b>																		
EN-2240: Network-Enabled Weather Observation System - Satellites Level 1	2010		D		E		2012											
EN-2241: Network-Enabled Weather Observation System - Satellites Level 2					2014		D		E		2016							
EN-2242: Network-Enabled Weather Observation System - Satellites Level 3										2018	D		E		2020			

This page intentionally left blank